

AFFDL-TR-69-123
VOLUME IV

AD706919

**A STABILITY AND CONTROL PREDICTION
METHOD FOR HELICOPTERS AND
STOPPABLE ROTOR AIRCRAFT**

**VOLUME IV
APPENDICES**

BILLY J. BIRD
Bell Helicopter Company
A Textron Company

TECHNICAL REPORT AFFDL-TR-69-123, VOLUME IV

MARCH 1970

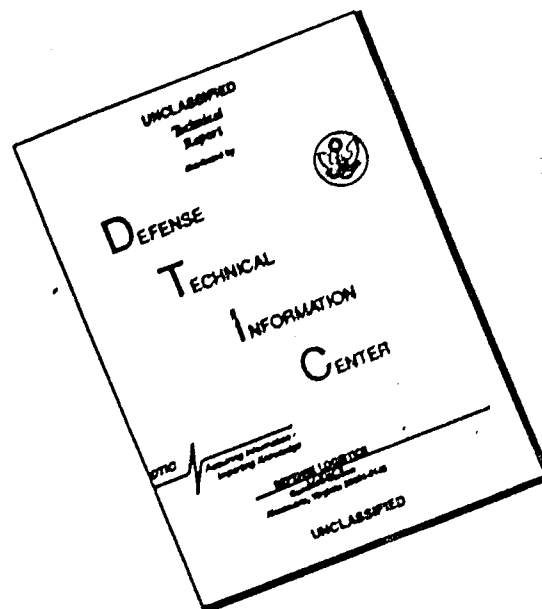
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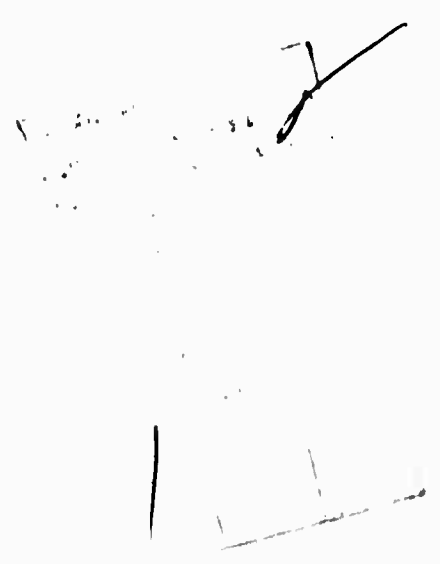
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FOREWORD

This report represents the results of the efforts expended in performance of Contract F33615-69-C-1121, "Development of Stability and Control Prediction Methods for Stoppable Rotor Aircraft." The work was performed by Bell Helicopter Company under Project No. 8219. It was sponsored by the Air Force Flight Dynamics Laboratory, Air Force Systems Command, from December 1968 through February 1970. Mr. Charles L. Livingston was the Bell Helicopter Company Project Engineer. Mr. Robert Nicholson was the Air Force Project Engineer.

This final report is presented in four volumes. The first describes the mathematical model and the methods used to calculate stability characteristics. They are of sufficient complexity that a digital computer is necessary for the solution of the equations. The second volume presents the results of sample computations and discusses input and output formats and good user techniques. The third volume describes the computer program while the fourth volume contains Appendices which are computer generated documentation of the program.

The author gratefully acknowledges the assistance of Messrs. B. L. Blankenship and Tyce McLarty of the Bell Helicopter Company Aeromechanics Group and Mr. C. L. Livingston of the Stability and Control Group in the development of the mathematical model.

This technical report has been reviewed and is approved.



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ABSTRACT

This report describes a mathematical model of rotorcraft that may be used to determine characteristics of performance, stability, response, and rotor blade loads. The complexity of the equations used requires the use of a digital computer for efficient solution. This four volume report describes the computer program in detail and illustrates the method of computing rotorcraft characteristics by specific example.

This volume contains the Appendices. Volume III describes the contents and use of these appendices in detail. The first and second volumes contain a discussion of the mathematical model and detailed instructions for the users of the program.

These appendices, which originate from card images for easy updating, are necessary tools for any programmer working on this program.

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APPENDIX A
VARIABLE DEFINITIONS

A	(171) ARRAY NAME FOR FORCES AND MOMENTS
B	(2) BM AND BTR
C	(21) MAIN ROTOR BLADE WEIGHT DISTRIBUTION
D	(79) TRIM VALUES OF A AND OTHER FORCES
E	1/2 RHO
F	(2) RM AND RTR
G	MANEUVER TIME
H	VELOCITY - AIR SPEED
I	GROSS WEIGHT
J	(17) COMPUTED CORRECTIONS IN TRIM
K	(3) UPPER SCALE LIMITS FOR PLOT
L	(3) LOWER SCALE LIMITS FOR PLOT
M	PITCH ANGLE OF ATTACK OF FUSELAGE
N	SIDESLIP (NEW VALUE)
O	(2) .5 * B
P	MAIN ROTOR NUMBER OF BLADES
Q	CD BEFORE RESOLUTION THROUGH INDUCED ANGLE OF ATTACK
R	CL BEFORE RESOLUTION THROUGH INDUCED ANGLE OF ATTACK
S	(21) TAIL ROTOR BLADE WEIGHT DISTRIBUTION
T	(2) ERM AND ETR
U	(2) MAST LENGTHS
V	FUSELAGE MOMENT OF INERTIA ABOUT X-AXIS (ROLL)
W	FUSELAGE MOMENT OF INERTIA ABOUT Y-AXIS (PITCH)
X	FUSELAGE MOMENT OF INERTIA ABOUT Z-AXIS (YAW)
Y	(2) ORM AND ORTR
Z	3.141593
AA	TOTAL ROLL MOMENT (X-COMPONENT - BODY REFERENCE)
AB	TOTAL PITCHING MOMENT (Y-COMPONENT - BODY REFERENCE)
AC	TOTAL YAW MOMENT (Z-COMPONENT - BODY REFERENCE)
AD	MAIN ROTOR RADIUS
AE	1. / V
AF	(2) T1MT AND T1TT
AG	(2) T2MT AND T2TT
AH	GROUND SPEED
AI	(2) 1. / NXR
AJ	TOTAL X-FORCE (BODY REFERENCE)
AK	INTERMEDIATE VARIABLE
AL	GROUND REFERENCE X-COMPONENT OF DISTANCE FLOWN
AM	TOTAL Y-FORCE (BODY REFERENCE)
AN	GROUND REFERENCE Y-COMPONENT OF DISTANCE FLOWN
AO	TOTAL Z-FORCE (BODY REFERENCE)
AP	GROUND REFERENCE Z-COMPONENT OF DISTANCE FLOWN
AQ	GEOMETRIC ANGLE OF ATTACK OF WING RELATIVE TO FUSELAGE CENTERLINE
AR	(2) ROTOR BLADE INERTIAS
AS	ALTITUDE
AT	(2) (EXH / R) **2
AV	FUSELAGE PITCH RATE
AW	PITCH (FIXED - FUSELAGE)
AX	FUSELAGE ROLL RATE
AY	ROLL (FIXED - FUSELAGE)
AZ	FUSELAGE YAW RATE
BA	YAW (FIXED - FUSELAGE)
BB	SIDESLIP (PREVIOUS VALUE)
BC	A1 MAIN ROTOR (FORE/AFT FLAPPING)

PTP TAIL ROTOR - NUMBER OF BLADES
 B1 MAIN ROTOR (LATERAL FLAPPING)
 SEE USERS GUIDE TO INPUT FORMAT, WING GROUP
 CLP SEE USERS GUIDE TO INPUT FORMAT, WING GROUP
 CLP SEE USERS GUIDE TO INPUT FORMAT, WING GROUP
 DCD DERIVATIVE OF CD WITH RESPECT TO ALPHA
 CQL SEE USERS GUIDE TO INPUT FORMAT, WING GROUP
 CQV SEE USERS GUIDE TO INPUT FORMAT, WING GROUP
 CXT DEGREES TO RADIAN CONVERSION FACTOR
 CXT (2) F/A SWASHPLATE INPUT FROM FLAT TRACKER
 CXT (2) LAT SWASHPLATE INPUT FROM FLAT TRACKER
 CXT PARTIAL DERIVATIVE INCREMENT FOR TRIM
 CXT MAIN ROTOR ALLOWABLE FLAPPING MOMENT ERROR FOR TRIM
 CXT (10) INPUT ALLOWABLE ERRORS ON TRIM FORCES AND MOMENTS
 CXT (2) EXM AND EXTR
 CXT (2) HUB EXTENTS
 CXT FLAG ON ENGINE TORSIONAL SYSTEM - NORMALLY=0
 CXT MAIN ROTOR H-FORCE
 CXT TAIL ROTOR H-FORCE
 CXT FLAG OR SWITCH TYPE VARIABLE
 CXT ITERATION LIMIT TO BALANCE ROTOR FLAPPING MOMENTS IN ITROT
 CXT FUSELAGE PRODUCT OF INERTIA
 CXT NUMBER OF EQUATIONS IN SYSTEM
 CXT X-COMPONENT OF MOMENT DUE TO MAIN ROTOR FORCES
 CXT Y-COMPONENT OF MOMENT DUE TO TAIL ROTOR FORCES
 CXT Y-COMPONENT OF MOMENT DUE TO MAIN ROTOR FORCES
 CXT Y-COMPONENT OF MOMENT DUE TO TAIL ROTOR FORCES
 CXT Z-COMPONENT OF MOMENT DUE TO MAIN ROTOR FORCE
 CXT Z-COMPONENT OF MOMENT DUE TO TAIL ROTOR FORCE
 CXT MAIN ROTOR TIP SPEED
 CXT INTERMEDIATE VARIABLE IN PEDAL CALCULATION
 CXT MAIN ROTOR PSI DOT = OMEGA
 CXT TORQUE REQUIRED TO MAINTAIN CONSTANT RPM ON MAIN ROTOR
 CXT MAIN ROTOR TORQUE
 CXT PROP-ROTOR COLLECTIVE GOVERNOR FLAG - 0 OR 10
 CXT COEFFICIENT FOR CALCULATING ENGINE TORQUE AVAILABLE
 CXT TAIL ROTOR TORQUE
 CXT 0* 1/2 AREA OF WING
 CXT AIR DENSITY AT ALTITUDE
 CXT 1. / 1Y
 CXT TAIL ROTOR RADIUS
 CXT 1. / 12.
 CXT (6,6,3) RATE DERIVATIVES IN STAB
 CXT (2) SIIDWASH COEFFICIENTS
 CXT MAIN ROTOR THRUST
 CXT TAIL ROTOR THRUST
 CXT MAIN ROTOR ROOT COLLECTIVE PITCH FROM CONTROLS
 CXT (2) TZMT AND TZTT
 CXT TAIL ROTOR ROOT COLLECTIVE PITCH FROM CONTROLS
 CXT MAIN ROTOR F/A CYCLIC PITCH FROM CONTROLS
 CXT TAIL ROTOR F/A CYCLIC PITCH FROM CONTROLS
 CXT MAIN ROTOR LATERAL CYCLIC PITCH FROM CONTROLS
 CXT TAIL ROTOR LATERAL CYCLIC PITCH FROM CONTROLS
 CXT (2) VIMP AND VITR
 CXT DOWNWASH VELOCITY ON WING FROM M.R. INDUCED VELOCITY

V12 .5 * VROT **2
 V14 V12 **2
 VXB FUSELAGE X VELOCITY
 VXS X-COMPONENT OF VROT IN SWASHPLATE REFERENCE
 VYB FUSELAGE Y VELOCITY
 VYS Y-COMPONENT OF VROT IN SWASHPLATE REFERENCE
 VZB FUSELAGE Z VELOCITY
 VZS Z-COMPONENT OF VROT IN SWASHPLATE REFERENCE
 XAR (2) X MOMENT ARM OF ROTOR HUB
 XAW (2) X-BOWWEIGHT GROUP INPUTS
 XFL (14) ELEVATOR GROUP INPUTS
 XFR (7) ALLOWABLE ERROR GROUP INPUTS
 XFC (28) FLIGHT CONSTANTS GROUP INPUTS
 XFV (7) FIN / RUDDER GROUP INPUTS
 XFS (35) FUSELAGE GROUP INPUTS
 XFW X-FORCE DUE TO WEIGHT
 XGV (7) WEAPONS GROUP INPUTS
 XIT (21) ITERATION LIMITS GROUP INPUTS
 XMA (2) XMA1 AND XMA2
 XMB (7) XMB1 AND XMB2
 XMR (49) MAIN ROTOR GROUP INPUTS
 XTR (49) TAIL ROTOR GROUP INPUTS
 XWC (21) WING GROUP INPUTS
 XXD X-COMPONENT OF VELOCITY - FIXED AXES
 YAR (2) Y MOMENT ARM OF ROTOR HUB
 YFL (21) INPUT CLCD CONSTANTS FOR ELEVATOR
 YFN (21) INPUT CLCD CONSTANTS FOR FIN
 YFS (14) COEFFICIENTS FOR CALCULATING FUSELAGE FORCES AND MOMENTS
 YFW Y-FORCE DUE TO WEIGHT
 YMR (21) INPUT CLCD CONSTANTS FOR MAIN ROTOR
 YTR (21) INPUT CLCD CONSTANTS FOR TAIL ROTOR
 YWG (21) INPUT CLCD CONSTANTS FOR WING
 YVD Y-COMPONENT OF VELOCITY - FIXED AXES
 ZAR VELOCITY OF SHIP CG DUE EAST IN FIXED REFERENCE
 ZFW (2) Z MOMENT ARM OF ROTOR HUB
 ZLV Z-FORCE DUE TO WEIGHT
 ZLV RATE OF DESCENT
 A1BP (2) A1BPM AND A1BPT
 A1BP (2) A1BPM AND A1BPT
 A1BP TOTAL ANGLE OF ATTACK OF ELEVATOR
 ALGF FIN GEOMETRIC ANGLE
 AP3G E.A. PITCH FUSELAGE - GUN
 APDR (2) APTD AND APTD
 APDR E.A. PITCH FIXED - FLIGHT PATH
 APTD MAIN ROTOR INSTANTANEOUS PITCH VELOCITY OF TIP PATH PLANE
 ARAC CONSTANT, = 0.
 ARDR (2) ARTD AND ARTD
 APTD MAIN ROTOR INSTANTANEOUS ROLL VELOCITY OF TIP PATH PLANE
 ASEP YAW PILOT VARIABLE
 AVRC E.A. YAW FUSELAGE - GUN
 AVFD E.A. YAW FIXED - FLIGHT PATH
 A1TR AT TAIL ROTOR
 A1TR (2) R * A1B
 BLGG OUTLINE LOCATION OF C.G.

BMTC	COEFFICIENT OF X DOT IN BOBWEIGHT EQUATION
BWTK	COEFFICIENT OF X IN BOBWEIGHT EQUATION
BWTH	CONSTANT MULTIPLIER OF (G - G PRELOAD) IN BOBWEIGHT EQUATION
BTTR	BT TAIL ROTOR
CDHB	(2) CD FOR HUB SEGMENTS
CGWL	CURRENT WATERLINE LOCATION OF CENTER OF GRAVITY
CLBO	SEE USERS GUIDE TO INPUT FORMAT. WING GROUP
CNBO	SEE USERS GUIDE TO INPUT FORMAT. WING GROUP
COLL	(6) INTERMEDIATE VARIABLES IN COLLECTIVE LINKAGES
CYCF	(3) INTERMEDIATE VARIABLES IN F/A CYCLIC LINKAGES
CYCL	(3) INTERMEDIATE VARIABLES IN LAT CYCLIC LINKAGES
CZET	COSINE OF ZETA
DAMP	MAXIMUM ERROR FOR XLIMIT HALVING IN TRIM
DEPD	(10) INCREMENTS USED FOR CALCULATING PD IN TRIM
DIST	DISTANCE FLOWN
DPIX	$IX / (IX^2 + IZ^2 - IXZ \cos 2\theta)$
DPIZ	$IZ / (IX^2 + IZ^2 - IXZ \cos 2\theta)$
DPSI	(2) CHANGE IN PSI BETWEEN AZIMUTH POSITIONS
DTRR	RADIANS TO DEGREES CONVERSION FACTOR
EPDS	PARTIAL DERIVATIVE INCREMENT FOR STAB
EPDX	(10) UNIT CONVERSION FACTOR IN APPLYING CORRECTIONS IN RATE
FRTR	TAIL ROTOR ALLOWABLE FLAPPING MOMENT ERROR FOR TRIM
ERYM	MAXIMUM ERROR FOR HALVING LMAX
ERTX	MAXIMUM ERROR FOR HALVING LMAX
FTAQ	CORRECTION TO DYNAMIC PRESSURE AT ELEVATOR DUE TO WING WAKE
FXIT	ERROR INDICATOR -NOT ZERO INDICATES ERROR AND TERMINATES JOB
FHPT	(2) FLAPPING HINGE POINTS
GFWD	G-LEVEL IN FUSELAGE X-DIRECTION
GLAY	G-LEVEL IN FUSELAGE Y-DIRECTION
ICOM	(49) COMMENTS
IPSN	PROBLEM SERIAL NUMBER
KCIT	(20) VALUES OF J ON MANEUVER
LELE	X-COMPONENT OF MOMENT DUE TO ELEVATOR
LFIN	X-COMPONENT OF MOMENT DUE TO FIN
LFUS	X-COMPONENT OF MOMENT DUE TO FUSELAGE
LGUN	X-COMPONENT OF MOMENT DUE TO GUN
LINK	SEGMENT INDICATOR TRIM=2 STAB=3 MANEUVER=4
LLAG	X-COMPONENT OF MOMENT DUE TO LEFT WING
LQMR	MAIN ROTOR TORQUE - X COMPONENT
LQTR	TAIL ROTOR TORQUE - X COMPONENT
LROT	(2) COUNTERS FOR ROTORS, USED IN WAG
LRWG	X-COMPONENT OF MOMENT DUE TO RIGHT WING
MASS	TOTAL MASS
MELE	Y-COMPONENT OF MOMENT DUE TO ELEVATOR
MEIN	Y-COMPONENT OF MOMENT DUE TO FIN
MFUS	Y-COMPONENT OF MOMENT DUE TO FUSELAGE
MGUN	Y-COMPONENT OF MOMENT DUE TO GUN
MLWG	Y-COMPONENT OF MOMENT DUE TO LEFT WING
MQMR	Y-COMPONENT OF MOMENT DUE TO MAIN ROTOR TORQUE
MQTR	Y-COMPONENT OF MOMENT DUE TO TAIL ROTOR TORQUE
MRWG	Y-COMPONENT OF MOMENT DUE TO RIGHT WING
NELE	Z-COMPONENT OF MOMENT DUE TO ELEVATOR
NEIN	Z-COMPONENT OF MOMENT DUE TO FIN
NFUS	Z-COMPONENT OF MOMENT DUE TO FUSELAGE

NGUM	Z-COMPONENT OF MOMENT DUE TO GUN
NJET	NUMBER OF JETS
NLWG	Z-COMPONENT OF MOMENT DUE TO LEFT WING
NPSI	(2) NUMBER OF AZIMUTH STATIONS
NQMR	Z-COMPONENT OF MOMENT DUE TO MAIN ROTOR TORQUE
NQTR	Z-COMPONENT OF MOMENT DUE TO TAIL ROTOR TORQUE
NRWG	Z-COMPONENT OF MOMENT DUE TO RIGHT WING
NWAG	INDICATOR- 1=USE WAGNER-BUETTIKER FUNCTIONS 0=DON'T
ORTR	TAIL ROTOR TIP SPEED
PEDA	(3) INTERMEDIATE VARIABLES IN PEDAL LINKAGE
PHOM	(2) PHOMM AND PHOMT
PSDD	PSI DOUBLE DOT
PSOT	TAIL ROTOR ANGULAR SPEED -PSI DOT
PSID	(2) PSD AND PSOT
QELE	Q* AREA OF ELEVATOR
QFIN	Q* AREA OF FIN
QMAX	MAXIMUM ENGINE TORQUE AVAILABLE
QMRS	ENGINE TORQUE SUPPLIED - TOTAL
OSV1	TORQUE AT TRIM POINT
RAIB	(2) 1. / AIB
RHOM	(2) RHOMM AND RHOMT
ROTJ	SIGN CHANGER, +1. = MAIN ROTOR, -1. = TAIL ROTOR
RTRP	(2) 1. / (TWOPI * RHO * R **2)
R550	1. / 550
SZET	SINE OF ZETA
TAXL	AUXILIARY THRUST LEFT
TAXR	AUXILIARY THRUST RIGHT OR CENTER
TIME	T - .05 * TDELT USED IN COMPARISONS INSTEAD OF T
TMAX	STOP TIME FOR TDELT CURRENTLY IN USE
TZMS	MAIN ROTOR COLLECTIVE IF LOCKED
TZMT	MAIN ROTOR TOTAL ROOT COLLECTIVE
TZTT	TAIL ROTOR TOTAL ROOT COLLECTIVE
TIMS	MAIN ROTOR F/A CYCLIC IF LOCKED
TIMT	MAIN ROTOR TOTAL F/A CYCLIC
TITS	TAIL ROTOR F/A CYCLIC IF LOCKED
TITT	TAIL ROTOR TOTAL F/A CYCLIC
T2MS	MAIN ROTOR LAT CYCLIC IF LOCKED
T2MT	MAIN ROTOR TOTAL LAT CYCLIC
T2TS	TAIL ROTOR LAT CYCLIC IF LOCKED
T2TT	TAIL ROTOR TOTAL LAT CYCLIC
VIER	DOWNWARD VELOCITY ON ELEVATOR FROM ON M.R. INDUCED VELOCITY
VIMR	MAIN ROTOR INDUCED VELOCITY
VITR	TAIL ROTOR INDUCED VELOCITY
VROT	VELOCITY OF THE ROTOR HUB
VSND	RECIPROCAL OF THE SPEED OF SOUND
WLCG	WATERLINE LOCATION OF CENTER OF GRAVITY
XAWG	X ARM OF THE WING
XCON	(63) CONTROLS GROUP INPUTS
XFMR	X-FORCE DUE TO MAIN ROTOR
XFTR	X-FORCE DUE TO TAIL ROTOR
XJET	(14) JET GROUP INPUTS
XR43	INTERMEDIATE VARIABLE
XLNK	(14) CONTROL LINKAGE RATIOS
XMAI	MAIN ROTOR LATERAL FLAPPING MOMENT

XMB1 MAIN ROTOR F/A FLAPPING MOMENT
 XMIN LOWER LIMIT ON VALUES OF XLIMIT
 YFIN (2) SAVED VALUES OF FIN LIFT -FOR DAMPING ON UNSTEADY AERODYNAMICS
 YFHR Y-FORCE DUE TO MAIN ROTOR
 YFTR Y-FORCE DUE TO TAIL ROTOR
 YHRF MAIN ROTOR Y-FORCE
 YTRF TAIL ROTOR Y -FORCE
 ZAWG Z ARM OF THE WING
 ZETA MAIN ROTOR MAST TILT ANGLE
 ZFEL (2) SAVED VALUES OF ELEVATOR LIFT - FOR UNSTEADY AERODYNAMICS
 ZFMR Z-FORCE DUE TO MAIN ROTOR
 ZFTR Z-FORCE DUE TO TAIL ROTOR
 ZZTR TAIL ROTOR ALTITUDE
 AIRPM MAIN ROTOR LAT FLAPPING MOMENT DESIRED
 AIRPT TAIL ROTOR LAT FLAPPING MOMENT DESIRED
 AIRRM MAIN ROTOR F/A FLAPPING MOMENT DESIRED
 AIRBT TAIL ROTOR F/A FLAPPING MOMENT DESIRED
 ALCYP ANGLE FOR AILERON EFFECT
 ALERT OFF/ON INDICATOR ON YAW PILOT
 ALFIN TOTAL ANGLE OF ATTACK OF THE FIN
 ALGEZ COEFFICIENT USED IN COMPUTING ELEVATOR ANGLE OF ATTACK
 ALGE1 COEFFICIENT USED IN COMPUTING ELEVATOR ANGLE OF ATTACK
 ALGE2 COEFFICIENT USED IN COMPUTING ELEVATOR ANGLE OF ATTACK
 ALLWG TOTAL ANGLE OF ATTACK ON THE LEFT WING
 ALRWG TOTAL ANGLE OF ATTACK ON THE RIGHT WING
 APTTD TAIL ROTOR INSTANTANEOUS PITCH VELOCITY OF TIP PATH PLANE
 ARTTD TAIL ROTOR INSTANTANEOUS ROLL VELOCITY OF TIP PATH PLANE
 AYOMX MAXIMUM YAW RATE
 AYEFP SIDESLIP INDICATOR
 AIBAL A1 AFTER MOMENT BALANCE IN STAB
 RFTA7 (2) PRECONES
 RNPST = NUMBER OF BLADES / NUMBER OF AZIMUTH STA.
 RIBAL A1 AFTER MOMENT BALANCE IN STAB
 CDELF CD ON ELEVATOR
 COFIN CD ON FIN
 CDLWG CD ON LEFT WING
 CDRWG CD ON RIGHT WING
 CGSTA CURRENT STATION LINE LOCATION OF CENTER OF GRAVITY
 CLACL SEF USERS GUIDE TO INPUT FORMAT, WING GROUP
 CLELE CL ON ELEVATOR
 CLFIN CL ON FIN
 CLLWG CL ON LEFT WING
 CLRWG CL ON RIGHT WING
 CLRWG CL ON RIGHT WING
 CNACL SEE USERS GUIDE TO INPUT FORMAT, WING GROUP
 CNPCD SEE USERS GUIDE TO INPUT FORMAT, WING GROUP
 CNPCL SEE USERS GUIDE TO INPUT FORMAT, WING GROUP
 CNRCD SEE USERS GUIDE TO INPUT FORMAT, WING GROUP
 CNRCL SEE USERS GUIDE TO INPUT FORMAT, WING GROUP
 COLKS SAVED VALUE OF COLSTK
 CONDI CONDITIONAL OUTPUT INDICATOR
 CONO2 CONDITIONAL OUTPUT INDICATOR
 CPWIC COLLECTIVE PITCH WING INCIDENCE COUPLING FACTOR
 CWING WING CHORD -MEAN AERODYNAMIC CHORD = SORT(AREA/AR)

CYCR1	INTERMEDIATE VARIABLE BETWEEN F/A CYCLIC STICK AND ROTOR
CYCR2	INTERMEDIATE VARIABLE BETWEEN LATERAL CYCLIC STICK AND ROTOR
CZET4	INTERMEDIATE VARIABLE IN CONTROL LINKAGES
CZET6	INTERMEDIATE VARIABLE IN CONTROL LINKAGES
CZET9	INTERMEDIATE VARIABLE IN CONTROL LINKAGES
DCAFR	(2) TIP VORTEX EFFECT COEFFICIENTS
DELTA2	DELTA TIME FOR RUNGE-KUTTA
DIXI2	IX - IZ
DIYIX	IY - IX
DIZIY	IZ - IY
DPIX2	$IX2 / (IX * IZ - IXZ **2)$
DIBWT	CHANGE IN COLLECTIVE PITCH DUE TO BOBWEIGHT
DTZMT	COLLECTIVE PITCH INPUT BY PROP ROTOR COLLECTIVE GOVERNOR
DTZM1	CHANGE IN COLLECTIVE PITCH DUE TO PITCH CONE COUPLING MAIN ROTOR
DTZT1	CHANGE IN COLLECTIVE PITCH DUE TO PITCH CONE COUPLING TAIL ROTOR
D3ELE	COLLECTIVE STICK -ELEVATOR INCIDENCE COUPLING FACTOR
FLOCK	F/A CYCLIC LOCK INDICATOR
FNSWC	FIN SIDE-WASH COEFFICIENT
FKTIS	FT/SEC TO KNOTS CONVERSION FACTOR
FVIND	INDUCED VELOCITY CHANGE LIMITER
GMAXV	TOTAL GUST VELOCITY = GMAXV1 + GMAXV2
GUFSS	INPUT CONTRL FOR FLIGHT CONSTANTS GUESSES
GVERT	G-LEVEL IN FUSELAGE Z-DIRECTION
HDLELT	.5 * TDELT
HGUST	FUSELAGE X-COMPONENT OF GUST VELOCITY
HLTRI	TAIL ROTOR MAST LENGTH IF SIDE-BY-SIDE, = 0. OTHERWISE
HLTR2	OPPOSITE OF HLTRI
HURKP	MAIN ROTOR F/A HUB SPRING RATE PER BLADE
HURKR	MAIN ROTOR LATERAL HUB SPRING RATE PER BLADE
ITORS	INERTIA OF TORSIONAL SYSTEM
KREAD	NUMBER OF MANEUVER CARDS FOR THIS RUN
KTCR	POINTER TO WHICH TIME INCREMENT IS BEING USED IN MANEUVER
LLJET	X-COMPONENT OF MOMENT DUE TO LEFT OR CENTER JET THRUST
LRJET	X-COMPONENT OF MOMENT DUE TO RIGHT JET THRUST
LWING	COUNTER ON UNSTEADY AERODYNAMIC EFFECTS -WAGNER FUNCTION
MLJET	Y-COMPONENT OF MOMENT DUE TO LEFT OR CENTER JET THRUST
MRJET	Y-COMPONENT OF MOMENT DUE TO RIGHT JET THRUST
NLJET	Z-COMPONENT OF MOMENT DUE TO LEFT OR CENTER JET THRUST
NPSI	NUMBER OF AZIMUTH STATIONS
NPART	PRIMARY PATH CONTROL VARIABLE
NPASS	TRIM ITERATION COUNTER
NRJET	Z-COMPONENT OF MOMENT DUE TO RIGHT JET THRUST
NVARA	SECONDARY PATH CONTROL VARIABLE OR PLOT CODE NUMBER
NVARB	SECONDARY PATH CONTROL VARIABLE OR PLOT CODE NUMBER
NVARC	SECONDARY PATH CONTROL VARIABLE OR PLOT CODE NUMBER
JMEGM	MAIN ROTOR SPEED IN RAD/SEC TARGET OR TRIM VALUE
PCDEL	CHANGE IN COLLECTIVE TO ADD TO M.R. AT THIS TIME INCREMENT
PEDAL	PEDAL POSITION IN PERCENT
PIU30	RADIANS/SEC TO RPM CONVERSION FACTOR, 30. / PI
PMOMH	MAIN ROTOR F/A HUBSPRING MOMENT, PER BLADE
PMOMT	TAIL ROTOR F/A HUBSPRING MOMENT, PER BLADE
PMREL	INPUT COEFFICIENT OF M.R. INDUCED VELOCITY ON ELEVATOR
PMRWG	INPUT COEFFICIENT OF M.R. INDUCED VELOCITY ON WING
PTRFN	INPUT COEFFICIENT OF T.R. INDUCED VELOCITY ON FIN

QMRSA	MAXIMUM ENGINE TORQUE SUPPLIED -LIMITED BY THROTTLE
RANGE	COLLECTIVE PITCH RANGE
RATE1	RAMP GUST -GMAXV1 / LNGTH1
RATE2	RAMP GUST -GMAXV2 / LNGTH2
RMASS	1. / MASS
RHOMM	MAIN ROTOR LAT HUBSPRING MOMENT, PER BLADE
RHOMT	TAIL ROTOR LAT HUBSPRING MOMENT, PER BLADE
RPST	INTERMEDIATE VARIABLE IN WING WAKE CALCULATIONS
STAGG	STATION LOCATIN OF CENTER OF GRAVITY
STOP2	END DISTANCE FOR 2ND RAMP OR HUMP -START2 +LNGTH2
SWING	WING SPAN
SWKR1	(2) F/A SPRING RATES FOR FOCUSSED PYLON EFFECT
SWKR2	(2) LAT SPRING RATES FOR FOCUSSED PYLON EFFECT
SZET5	INTERMEDIATE VARIABLE IN CONTROL LINKAGES
SZET7	INTERMEDIATE VARIABLE IN CONTROL LINKAGES
SZET8	INTERMEDIATE VARIABLE IN CONTROL LINKAGES
TDLT	TIME INCREMENT FOR MANEUVER SECTION
THROT	(2) PREVIOUS VALUE OF ROTOR THRUST
TIP38	(2) TIP LOSS FACTORS
TRALT	TAIL ROTOR ALTITUDE
TWOPI	6.283185
TZERO	START TIME FOR MANEUVER
VGUST	FUSELAGE Z-COMPONENT OF GUST VELOCITY
VYAXE	VELOCITY AT WHICH ELEVATOR IS COMPLETELY SUBMERGED IN MR WAKE
WCOL	WING ANGLE OF ATTACK DUE TO COLLECTIVE COUPLING
XAELE	X ARM OF THE ELEVATOR
XAFIN	X ARM OF THE FIN
XAFUS	X ARM OF THE FUSELAGE
XAGUN	X ARM OF THE GUN
XAJET	X ARM OF THE JETS
XAPYL	X ARM OF THE PYLON
XARSP	(2) X ARM OF THE ROTOR SHAFT PIVOT POINT
XFELE	X-FORCE DUE TO ELEVATOR
XFFIN	X-FORCE DUE TO FIN
XFFUS	X-FORCE DUE TO FUSELAGE
XFGUN	X-FORCE DUE TO GUN
XFLWG	X-FORCE DUE TO LEFT WING
XFRWG	X-FORCE DUE TO RIGHT WING
XGUST	DISTANCE TO BEGINNING OF GUST AT ZERO
XLOCK	LATERAL CYCLIC LOCK INDICATOR
XMAIT	TAIL ROTOR LATERAL FLAPPING MOMENT
XMBIT	TAIL ROTOR F/A FLAPPING MOMENT
XSTAH	(2) XSTAHM AND XSTAHT
VAELE	Y ARM OF THE ELEVATOR
YAFIN	Y ARM OF THE FIN
YAFUS	Y ARM OF THE FUSELAGE
YAGUN	Y ARM OF THE GUN
YALWG	Y ARM OF THE LEFT WING
YARWG	Y ARM OF THE RIGHT WING
YFFIN	Y-FORCE DUE TO FIN
YFFUS	Y-FORCE DUE TO FUSELAGE
YFGUN	Y-FORCE DUE TO GUN
YGUST	FUSELAGE Y-COMPONENT OF GUST VELOCITY
YSTAH	(2) YSTAHM AND YSTAHT

ZAELE	Z	ARM OF THE ELEVATOR
ZAFIN	:	ARM OF THE FIN
ZAFUS	Z	ARM OF THE FUSELAGE
ZAGUN	Z	ARM OF THE GUN
ZAJET	Z	ARM OF THE JETS
ZAPYL	Z	ARM OF THE PYLON - INTERMEDIATE VARIABLE
ZARSP	(2)	Z ARM OF THE ROTOR SHAFT PIVOT POINT
ZFTAR	(2)	ZETA AND ZETATR
ZFELE	Z	FORCE DUE TO ELEVATOR
ZFFUS	Z	FORCE DUE TO FUSELAGE
ZFGUN	Z	FORCE DUE TO GUN
ZFLWG	Z	FORCE DUE TO LEFT WING
ZFRWG	Z	FORCE DUE TO RIGHT WING
ZMAX2		STOP TIME FOR SECOND TIME INCREMENT
ZMAX3		STOP TIME FOR THIRD TIME INCREMENT
ALECR1		WING ANGLE OF ATTACK FOR AILERON EFFECT
ALGFPO		RUDDER ANGLE OF ATTACK FROM PEDAL
APBJET		E.A. PITCH, FUSELAGE TO JET
ARBJET		CONSTANT, = 0.
ASECOL		YAW PILOT VARIABLE
AYBJET		E.A. YAW, FUSELAGE TO JET
9OTTOM		LOWER LIMIT OF COLLECTIVE PITCH
CNPCD1		INTERMEDIATE VARIABLE. FUNCTION OF CNPCD
CNPCD2		INTERMEDIATE VARIABLE. FUNCTION OF CNPCD
COLJET		COLLECTIVE STICK - JET THRUST COUPLING FACTOR
COLSTK		COLLECTIVE STICK POSITION IN PERCENT
CYPWIC		LATERAL CYCLIC STICK WING INCIDENCE COUPLING FACTOR (AILERON EFF)
CYSTK1		FORE/AFT CYCLIC STICK POSITION IN PERCENT
CYSTK2		LATERAL CYCLIC STICK POSITION IN PERCENT
CZET11		INTERMEDIATE VARIABLE IN CONTROL LINKAGES
CZET12		INTERMEDIATE VARIABLE IN CONTROL LINKAGES
CZET13		INTERMEDIATE VARIABLE IN CONTROL LINKAGES
DCAFXK		DCAFR * XK
DEL2R		L. / DELT2
DQDCOL		O TORQUE / O COLLECTIVE FROM TRIM SECTION
DTRRSQ		RADIANS **2 TO DEGREES **2 CONVERSION FACTOR, DTRR **2
EIMAST		COUPLING COEFFICIENT MAST TILT TO ELEVATOR INCIDENCE
FIZETA		ELEVATOR ANGLE OF ATTACK FROM MAST TILT
ENGRPH		ENGINE RPM
ETAOMX		REFERENCE VALUE OF ETAQ -AT CENTERLINE OF WING WAKE
GEARAT		GEAR RATIO TAIL ROTOR /MAIN ROTOR
GMAXV1		FIRST MAXIMUM GUST VELOCITY
GMAXV2		SECOND MAXIMUM CHANGE IN GUST VELOCITY
GMAXV3		INTERMEDIATE VARIABLE = GMAXV1 -START2 *RATE2
GPREDL		G PRELOAD FOR BOBWEIGHT
GUSTYP		TYPE OF GUST -9,10,11,OR 12 AS J VALUE FOR GIVEN CASE
HALFPI		1.570796, .5 * PI
HFORCE		HMR AND HTR
HGUSTE		HORIZONTAL GUST VELOCITY AT ELEVATOR
HGUSTF		HORIZONTAL GUST VELOCITY AT FIN
HGUSTW		HORIZONTAL GUST VELOCITY AT WING
HPLYLD		DISTANCE FROM M.R. PIVOT POINT TO FLAT PLATE DRAG C.P. ON MAST
HNP5IR		2. /NOP5I
HUBKPR		HUBKP AND HUBKTP

HUBKPS	SPRING RATE PER BLADE -MAIN ROTOR	PITCH (F/A)
HUBKRP	HUBKR AND HUBKTR	
HUBKRS	SPRING RATE PER BLADE -MAIN ROTOR	ROLL
HUBKTP	TAIL ROTOR F/A HUB SPRING RATE PER BLADE	
HUBKTR	TAIL ROTOR LATERAL HUB SPRING RATE PER BLADE	
HUBTPS	SPRING RATE PER BLADE -TAIL ROTOR	PITCH
HUBTRS	SPRING RATE PER BLADE -TAIL ROTOR	ROLL
IPRINT	BLADE ELEMENT DATA PRINT INDICATOR	
KONFIG	CONFIGURATION NUMBER, = 1. + TRIND + TRIND1	
LAMBDA	VELOCITY *SIN(ALFA) -INDUCED VELOCITY (NOT DIVIDED BY OMEGA *R)	
LNGLH1	LENGTH OF FIRST RAMP OR BASE OF HUMP FOR SIN**2 GUST	
WXPASS	MAXIMUM NUMBER OF ITERATION ALLOWED IN TRIM (INPUT)	
VORAM	NUMBER OF RADIAL STATIONS	
VSCALE	SCALE FACTOR FOR PLOTS	
OMEGMD	RATE OF CHANGE OF MAIN ROTOR SPEED (TARGET)	RAD/SEC**2
PCGDEF	PCG DEAD BAND	
PCGMAX	MAXIMUM VALUE OF PCRATE	
PCRATE	RATE OF CHANGE OF PCDEL	
PILGH1	INTERMEDIATE GUST VARIABLE = PI / LNGLH1	
PILGH2	INTERMEDIATE GUST VARIABLE = PI / LNGLH2	
PSD3OP	MAIN ROTOR TO ENGINE GEAR RATIO	
PSD550	PSD / 550.	
PWGK1	COEFFICIENT FOR DEFLECTION OF WING MAKE CENTERLINE	
P1DTR	.0001745329, .01 * DTR	
PCWING	1. / CWING	
RDILT1	1. / TDILT	
RDILT2	1. / HDILT	
RITORS	1. / ITORS	
RUDIND	RUDDER INDICATOR 1-WITH 0= WITHOUT	
START2	START DISTANCE FOR 2ND RAMP OR HUMP FROM END OF 1ST GUST	
SWINGH	.5 * SWING	
SZFT1	INTERMEDIATE VARIABLE IN CONTROL LINKAGES	
TCLOCK	TAIL ROTOR COLLECTIVE LOCK	
VENTER	VELOCITY AT WHICH ELEVATOR ENTERS M.R. MAKE	
VGUSTE	VERTICAL GUST VELOCITY ON ELEVATOR	
VGUSTW	VERTICAL GUST VELOCITY ON WING	
VXWVER	INTERMEDIATE VARIABLE = 1. / (VMAXE-VENTER)	
WPOTOR	WEIGHT OF HUB ASSEMBLY AND BLADES	
XAPYLD	X ARM OF THE PYLON DRAG	
XFLJET	X FORCE DUE TO LEFT OR CENTER JET	
XFRJET	X FORCE DUE TO RIGHT JET	
XLIMIT	MAXIMUM AMOUNT TRIM VARIABLES CAN CHANGE	
XLMAXM	MAXIMUM VALUE OF XLIM FOR MAIN ROTOR	
XLMAXT	MAXIMUM VALUE OF XLIM FOR TAIL ROTOR	
XLMINM	MINIMUM VALUE OF XLIM FOR MAIN ROTOR	
XLMINT	MINIMUM VALUE OF XLIM FOR TAIL ROTOR	
XSTANT	TAIL ROTOR NORTH-SOUTH DISTANCE FROM START OF GUST TO HUB	
VALJET	Y ARM OF LEFT OR CENTER JET	
VARJET	Y ARM OF RIGHT JET	
VFLJET	Y FORCE DUE TO LEFT OR CENTER JET	
VFRJET	Y FORCE DUE TO RIGHT JET	
VGUSTF	LATERAL GUST VELOCITY ON THE FIN	
VGUSTW	LATERAL GUST VELOCITY AT THE WING STATION LINE	
YSTAMP	MAIN ROTOR EAST-WEST DISTANCE FROM START OF GUST TO HUB	

YSTAT	TAIL ROTOR EAST-WEST DISTANCE FROM START OF GUST TO HUB
ZAPYLD	Z ARM OF THE PYLON DRAG
ZDELT1	FIRST AND THIRD TIME INCREMENT FOR RUNGE-KUTTA INTEGRATION
ZDELT2	SECOND TIME INCREMENT FOR RUNGE-KUTTA INTEGRATION
ZETATR	TAIL ROTOR MAST TILT ANGLE
ZFLJET	Z FORCE DUE TO LEFT JET
ZFLWG1	SAVED VALUES OF LEFT WING LIFT- FOR UNSTEADY AERODYNAMICS
ZFRJET	Z FORCE DUE TO RIGHT OR CENTER JET
ZFRWG1	SAVED VALUES OF RIGHT WING LIFT FOR UNSTEADY AERODYNAMICS

APPENDIX B

SUBROUTINES AND COMMONS CONTAINING EACH COMMON AND VARIABLE

VARIABLE		C R I A D I M T I V R I D A C S W R A M I V P G T W S L S J A O W T P S D I P C C U 8 U I R L V E T																									
IY		X	X																								
IP		X	X																								
QR																											
PD																											
PI		X																									
OL																											
OM																											
ON																											
OC																											
OM																											
OT1																											
OT2																											
VM																											
XH																											
XF																											
XX																											
XX																											
XY																											
YE																											
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ZF																											
ZZ																											
AGM																											
ATB																											
ATR																											
ALT																											
AIR																											
APD																											
APC																											
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AYD																											
AYF																											
AYI																											
AIM																											
ATR																											
BIM																											
CLP																											
CLR																											
DCD																											
NOL																											
DOM																											
DTR																											
DT1																											
DT2																											
FPD																											
FRM																											

STRIAB 550
 STRIAB 560
 ROMAN 570
 STRIAB 580
 ROSTAR 590
 FORCE 600
 FORCE 610
 FORCE 620
 STAMAN 630
 ROMAN 640
 STAMAN 650
 ROMAN 660
 ROMAN 670
 STRIMA 680
 ROSTAR 690
 FORCE 700
 ANDOIT 710
 STAMAN 720
 ANDOIT 730
 FORCE 740
 STAMAN 750
 FORCE 760
 ROMAN 770
 STRIMA 780
 ROMAN 790
 ROMAN 800
 ROSTAR 810
 ROSTAR 820
 MANARO 830
 MANARO 840
 MANARO 850
 MANARO 860
 MANARO 870
 MANARO 880
 STAMAN 890
 MANARO 900
 STAMARO 910
 MANARO 920
 STAMAN 930
 STAMAN 940
 STAMAN 950
 STAMAN 960
 STAMAN 970
 STRIAB 980
 STRIMA 990
 STRIMA 1000
 STRIAB 1010
 ROSTAR 1020

[illegible]

C S R C M T I V R I D A C S M I V P G T W S L L S J A O W T P S D I I P C C
 B T E O N I M T R O A C A O M I R G S L F A O D E O C T P M A E E R
 I A O I M T I O T O N L W R A M A C C U I R T M A E A J F R R A O A T V P 8 U
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 T I R O I M T I O T O N L W R A M A C C U I R T M A E A J F R R A O A T V P 8 U

VARIABLE

ARBG ARDD ARDM *ARDR ARDS ARFM ARTD ASEP AYBG AYDD AYFP AYFM AITR BAIB BETA BLCG BMTK BMTM BTR CDH8 CG8L CGWL CLBQ CNBQ COLL COSE CYCF CYCL CZET DAMP DEPD DIST DPIX DPIZ DPSI DTRR EPDS EPDX ERTR ERXM ERXT ETAQ FXIT FMPT GFWD GLAT ICOM

STANAN 1990
 ROMAN 2000
 ANDOIT 2010
 ROMAN 2020
 ANDOIT 2030
 ROMAN 2040
 ANDOIT 2050
 STANAN 2060
 STANAN 2070
 ROMAN 2080
 STRIMA 2090
 ANDOIT 2100
 MANARO 2110
 STANAN 2120
 ROMAN 2130
 STRIAB 2140
 STANAN 2150
 STANAN 2160
 STANAN 2170
 MANARO 2180
 RUSTAR 2190
 STANAN 2200
 STRIMA 2210
 STANAN 2220
 STANAN 2230
 STRIMA 2240
 STANAN 2250
 STRIMA 2260
 STRIMA 2270
 MANAL 2280
 STRIAB 2290
 STRIAB 2300
 STRIMA 2310
 STANAN 2320
 STANAN 2330
 ROMAN 2340
 ROMAN 2350
 STRIAB 2360
 STRIAB 2370
 RUSTAR 2380
 RUSTAR 2390
 RUSTAR 2400
 STANAN 2410
 TOPLOT 2420
 STANAN 2430
 MANARO 2440
 MANARO 2450
 TOPLOT 2460

C S R C M T I V R I O A C S W M I V P G T W S L L S J A O W T P S D I I P C C
 8 T E O N I N I O T O N L W R A N A C G U I R F A O D E O C T P M A E E M T
 I A A E N E N R O O T R A C A O N I R G S L F A O D E O C T P M A E E M T
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VARIABLE	N																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										</
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3910	STRIAB
3920	STARAN
3930	STARAN
3940	STARAN
3950	STARAN
3960	STANRO
3970	ROMAN
3980	ROSTAR
3990	STRIMA
4000	MANAL
4010	MANAL
4020	MANAL
4030	MANA.
4040	MANAL
4050	MANAL
4060	ROSTAR
4070	STAMAN
4080	STRIMA
4090	STRIMA
4100	STRIMA
4110	STAMAN
4120	STAMAN
4130	STRIMA
4140	STRIMA
4150	STRIMA
4160	STARAN
4170	MANAL
4180	STARAN
4190	STRIMA
4200	ROSTAR
4210	AMOOIT
4220	ROMAN
4230	STRIAB
4240	MANARO
4250	STAMAN
4260	STAMAN
4270	STAMAN
4280	STAMAN
4290	STRIMA
4300	STRIMA
4310	ROMAN
4320	ROMAN
4330	STAMAN
4340	STAMAN
4350	STRIMA
4360	STAMAN
4370	FORCE
4380	FORCE

[illegible]

VARIABLE	8	1	C	S	R	C	M	T	I	V	R	I	O	A	C	S	M	I	V	P	G	T	W	S	L	S	J	A	O	W	T	P	S	D	I	I	P	C	C
SHEAR																																							
START2																																							
SMINGH																																							
SZET1																																							
TLOCK																																							
*THRUST																																							
*TORQUE																																							
TRIND1																																							
TRIND2																																							
URGUST																																							
URGUST																																							
UTGUST																																							
VENTER																																							
VGUSTE																																							
VGUSTW																																							
VHVER																																							
*VZETAR																																							
VZETAT																																							
WROTOR																																							
XAPYLD																																							
XFLJET																																							
XFRJET																																							
*XLIMAX																																							
*XLIMIN																																							
XLIMIT																																							
XLMAX																																							
XLMAXT																																							
XLMAXW																																							
XLMIN																																							
XLMINW																																							
XLINT																																							
XSTAHM																																							
XSTAHT																																							
YALJET																																							
YARJET																																							
YFLJET																																							
*YFORCF																																							
YFRJET																																							
YGUSTF																																							
YGUSTW																																							
YSTAHM																																							
YSTAHT																																							
ZAPYLD																																							
ZDELT1																																							
ZDELT2																																							
ZETATR																																							
ZFLJET																																							
ZFLWGI																																							
ZFRJET																																							
ZFRWGI																																							

APPENDIX C
COMMONS AND VARIABLES IN EACH SUBROUTINE AND COMMON

C81

C81

TOPLOT
AH
AL
EXIT
IPSN
NPART
NTIME
NVARA
NVARB
NVARC
NVAR5
NPRINT
NSCALE

START

STRIAB
STRIMA
STANAN
MANAL
ROMAN
MANARD
STANRO
ROSTAR
STARAN
*B
D
Q
T
W
BH
BM
DT
IX
IY
IZ
PI
ZZ
AGW
APE
ARE
AYE
ALM
BTR
BIM
CLP
CLR
DTR
ERM
ERR
ITM
IXZ
PSD
QMG
RHO
R12
SWC
TMR
TTR
XBW
XEL
XER
XFC
XFN

XFS
XGN
XIT
XMR
XTR
XWG
XXP
YEL
YFN
YFS
YMR
YTR
YWG
YYD
ZZD
ALGF
APBG
AYBG
A1TR
BA1B
BLCG
BUTC
BWTG
BWTM
BLTR
CGBL
CGWL
CLBO
CNBO
DAMP
DTRR
EPDS
ERTR
ERXM
ERXT
KVAR
NJET
NSDT
QELE
OFIN
QMAX
RA1B
TAIR
TAXL
TAXR
VSND
WLCG
XANG

XCON
XJET
XMIN
ZANG
ZETA
ALGEZ
CGSTA
CLBCL
CNBCL
CNPCD
CNPCL
CNPCD
CNRCL
COND1
COND2
D3ELE
FNSWC
FVIND
GUESS
OMEGH
PEDAL
PIU30
PMREL
PMRWG
PTRFN
STACG
TRIND
TSTAB
TMOPI
VMAXE
XAELE
XAFIN
XAFUS
XAGUN
XAJET
XAPYL
YAELE
YAERO
YAFIN
YAFUS
YARWG
ZAELE
ZAFIN
ZAFUS
ZAGUN
ZAJET
ZAPYL

*ZETAR
APBJET
AYBJET
COLJET
COLSTK
CYSTK1
CYSTK2
DTRRSO
EIMAST
ENGRPH
ETAQMX
GEARAT
*PRELD
ALFPI
HLPYLD
HXPASS
PCGDED
PCGMAX
PSD30P
PMGEL1
PMGWL1
POIDTR
*THRUST
TRIND1
VENTER
XLIMIT
XLMINH
XLMINI
YARJET
ZETATR

START

READIN

READIN

STRIAB
STRIMA
TOPLDT
D
DT
XBW
XEL
XER
XFC
XFN
XFS
XGN
XIT
XMR
XTR
XWG
YEL
YFN
YMR
YTR
YWG
ICOM
IPSN
KCIT
TMAX
XCIT
XCON
XJET
GUFSS
KRFAD
NPART
TSTAB
TZERO
ZMAX2
ZMAX3
ZDELT1
ZDELT2

CON1

CON1

STRIMA
MANAL
CULL
CYCF
CYCL
PFDA
T2MS
T2TS
TIMS
T1TS
T2MS
T2TS
ALGE1
ALGE2
CLOCK
CPMIC
FLOCK
XLOCK
CYPMIC
HALFPI
RUDIND
TCLOCK

MNEM

FORCE
STRIAB
STIRMA
STAHAN
MANAL
ROMAN
MANARD
STANRO
POSTAR
TOPLJT
STARAN
Q
V
W
Y
AM
AP
BM
CT
HL
IX
IY
IZ
RC
RM
PW
XF
XZ
AGW
ALT
APD
APE
ARD
ARE
AYD
AYE
AIM
RTP
RIM
DOL
DON
DTR
ERR
HMR
HTR
IND
ITM
IXZ

NXR
ORM
PED
PSD
OMX
QTR
OMG
RIY
SWC
TMR
TTR
T2M
T2T
T1M
T1T
T2M
T2T
UHS
VIW
VXB
VXS
VVB
VVS
VZB
VZS
XAR
XFC
XFM
XMR
XWG
XXD
XAR
YES
YFW
YWG
YYD
ZAR
ZFW
ZZD
ALEL
APDD
APFP
ARDD
AYDD
AYFP
A1TR
BA1B
BETA

B1TR
CGWL
COLL
COSE
CYCF
CYCL
CZET
DAMP
DPIX
DPIZ
DPSI
EPOS
ERXM
ERXT
ETAQ
EXIT
LINK
MASS
NJET
NPSI
NWAG
ORTR
PEDA
PSDD
PSDT
RTRP
R550
SZET
TATR
TAXL
TAXR
TMAX
VIER
VIMR
VITR
VROT
VSND
XAMG
XCON
XMAI
XMB1
XMIN
XMYR
YTRF
ZAMG
ZETA
ZZTR

ALFIN
ALLWG
ALRWG
APBMT
ARBMT
AYBMT
BETAE
BETAN
BETAX
BETAZ
BETAC
BNPSI
CODEL
CDEFIN
COLWG
CORWG
CGSTA
CLELE
CLFIN
CLLWG
CLRWG
CMPCD
COLKS
CING
CYCR1
CYCR2
DIXIZ
DIYIX
DIZTY
DPIXZ
GUFSS
HLTR1
HLTR2
ITORS
LLJET
LRJET
LWING
MLJET
MRJET
NPART
NPJET
NVARA
NVARC
NVARD
PEDAL
PMREL
RMASS

RP1ST
SWING
TRALT
TRIND
TWIST
TZERO
VMAXE
XAELE
XAJET
XARSP
XMBIT
XMAIT
YAERO
YALWG
YARSP
YARWG
ZAELE
ZAJET
ZARSP
ZMAX2
ZMAX3
APBJET
ARBJET
AYBJET
CNPCD1
CNPCD2
COLJET
COLSTK
CYSTK1
CYSTK2
DXWGEL
DZWGEL
GEARAT
GUSTYP
HALFPI
HGUSTE
HGUSTF
HGUSTW
HNPSIR
IBRAKE
KONFIG
PILGH2
PSD55D
PSIREF
PSISTP
RCWING
RITORS
RUOTND

SWINGH
TRIND1
TRIND2
UPGUST
URGUST
UTGUST
VENTER
VGUSTE
VGUSTW
VXWVER
WROTOR
XFLJET
XFRJET
XLIMIT
XLMAXM
XLMAXT
XLMINM
XLMINM
YALJET
YARJET
YFLJET
YFRJET
YGUSTF
YGUSTW
ZDELT1
ZDELT2
ZETATR
ZFLJET
ZFRJET

MNEM

TINY

TINY

STRIMA
STAMAN
HL
VH
DT1
DT2
KPD
QOO
XXO
YYO
ZZO
APFP
ARBG
ASEP
AYFP
QMAX
R550
TAIR
ALERT
AYOMX
DTBMT
DTZMT
DTZMI
DTZTI
FTKTS
HGUST
HLTR2
ISTOP
KTCTR
PCDEL
QMRSA
TRALT
TSTAB
VGUST
YGUST
ASECOL
IBRAKE
OMEGMD
PCRATE
RITORS
TRIND2

INRO

INR 0

STRIAB
STAMAN
ROMAN
POSTAR

D R A M O T M L O P P M X B A I A A R A A R O T P F X H N X R G R M P C C P S D P B M R H N R T R R P I 2 V X S V Y S V 7 S V A I A I A P A D T A P A P I C C O M C O S C O S P Y A C H A L R I N P S P S D P S P A I A T P M L C A I B A

AIBPT AIBRM AIBRT AIBTT ARTTD AZETA BBTAN BETAX BETAZ CONE CDAFR HUBKP HUBKR STACG SWK1 SWK2 TIP18 TIP38 TRIND TWIST TwOPT VZETA XARSP YARSP ZARSP #AZETAR AZETAT RFTAZD RFTAZS CLPADK DELTA3 #HUBKPR HUBKPS #HUBKRR HUBKRS HUBKTP HUKATR MJATPS MJBTPS PSITFF #VZETAR VZETAT

VIND

VIND

20MAN
WAVAR
STARR
RISTAR
*2
*R
44
CT
*30
RM
ALT
AJP
HTQ
ORM
RTQ
IHS
*VIP
VZS
*PTC
VIMP
VITP
VONT
LAFDA

ROTAN

XLMAXT
*YFORCE
VGUSTF
ZETATR

ARTTD
AYBMT
AZETA
AIBAL
BIBAL
CBFAC
COND2
DCAFR
GOISK
GVERT
NOPSI
NVAEC
NVAEC
RMOMM
RMONT
SMKR1
SMKR2
TANT1
TANT2
TOELT
THROT
TRIND
VZETA
XMOND
XMONL
*ZETA
*AZETA
AZETAT
DCAFK
GUSTYP
*HFDPCF
HGUSTE
HGUSTF
HGUSTW
IPRINT
KONFIG
NORADI
SHEARD
SHEARL
SHFARR
*THRUST
VGUSTE
VGUSTW
*VZETA
VZETAT
WRNOR
*XLIMAX
XLMAXW

XAR
VAR
ZAR
APDD
APDM
*APDP
APDS
APFM
APTD
ARDD
APOM
*ARDR
APDS
ARFM
APTD
AYDD
AYFW
ALTR
ALTP
CXIT
GFWD
GLAT
LINK
LROT
NPSI
NWAG
NATR
PSOT
*PSIN
*PMJM
RATJ
TATP
TINT
TITT
T2MT
T2TT
V2OT
XK43
XLIM
YARF
YTRF
ZETA
Z2TR
APBMT
APDBS
APTTD
APBMT
ARDRS

ROTAN

ANDJIT
POMAN
MANARO
STANRO
RUSTAR
TOPLAT
T
J
*P
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V
AL
AL
*QS
PM
*T1
*T2
XK
Z2
ALY
APD
APF
APD
APF
AYD
AYF
ALM
ALM
HNP
HTR
IND
NJR
NQM
PSO
WTC
SWC
TWP
TTC
UHS
VHS
V12
V14
VXR
VXS
VVR
VVS
V7R
VZS

ITROT

ITROT

ANDJIT	*RMOM
ROMAN	RTRP
MANARO	TZMT
STANRO	TZTT
ROSTAR	VIMR
TOPLOT	VITR
I	XLIM
J	XMAI
AI	XMBI
BI	YMRP
CT	YTRF
*ER	AIBPH
*NP	AIBPT
PI	AIBRM
XY	AIBRT
ERM	APDBS
*ERX	ARDBS
HMR	BETAE
HTR	BETAN
ITM	BFTAX
ORM	BETAZ
PCC	BETAO
PSD	BNPSI
OMX	CONOI
QTR	COND2
TMR	FVIND
TTR	PMOMM
*TZP	PMOMT
*VIR	RMOMM
VI2	RMOMT
VI4	TANAI
VZS	TANBI
*XMA	XMAIT
*XMB	XMBIT
*AIP	XMOMO
*AIBR	XMOML
DTRR	DCAFXK
ERTR	*HFORCE
ERXM	LAMBDA
ERXT	SHEARD
EXIT	SHEARL
LINK	SHEARR
ORTR	*THRUST
PFAC	*TORQUE
*PHJM	*XLIMIN
PSDI	XLMINM
*PSID	XLMINT
RFAC	*YFORCE

DOROT

ANDOT
ROMAN
MANARO
STANRO
RUSTAR
TOPLOT
*P
Y
AM
*OP
RM
XB
XK
XY
AT9
FXH
HMR
HTR
ORM
PSD
OMX
QTR
PBH
RT9
TMP
TTP
*TZR
*VTR
VXS
VYS
VZS
*XMA
*XM3
APOM
APOS
APFM
ARDM
ARDS
APFM
AYFM
AFT1
CONB
CONF
DPSI
DIRR
EXIT
LINK
ORTR

PFAC
*PMOM
PSDT
*PSTD
RAIB
RFAC
*RMOM
RTJ
TZNT
TZTT
VIMR
VITR
VSND
XK43
XMA1
XMB1
YARF
YTRF
BETAD
BETAE
BETAN
BETAX
BETAZ
BETAQ
CBFAC
CONEK
GDISK
GMAXV
HUBKP
HUBKR
NDPSI
PHOMM
PHOMT
RATE1
RATE2
RHOMM
RHOMT
STOP2
TANAI
TANB1
TANT1
TANT2
TIP18
TIP30
TWIST
XGUST
XMAIT
XMBIT

XMODD
XMOHL
*XSTAH
*YSTAH
BETAZD
CLRADK
DELTA3
GMAXV1
GMAXV2
GMAXV3
GUSTYP
*MFORCE
HNPSTR
*HUBKPR
HUBKPS
*HUBKRR
HUBKRS
HUBKTP
HUBKTR
HUBTIPS
HUBTRS
IPRINT
LAMBDA
LNGTH1
NORADL
PILGH1
PILGH2
PSIREF
SHEARD
SHEARL
SHEARR
START2
*THRUST
*TORQUE
UPGUST
URGUST
UTGUST
XSTAHM
XSTAHT
*YFORCE
YSTAHM
YSTAHT

DOROT

[illegible]

VIM
VVA
VVR
VVB
XAP
YFM
YFS
YVM
ZFM
ZFW
MAL
QALB
CLCN
CMN
CZET
FYAQ
FRYT
GGFG
DGLAT
LFLF
LFUS
LFUN
LGPI
LLMR
LQTR
LRMG
MRELE
MFNF
MFUS
MNGU
MQNR
MQTR
MPBR
MFNF
MFNF
MFUS
MNJN
MNLG
NMQR
NQTR
NNRW
MMAG
PSON
QOFL

QF IN
SZFY
TAXL
TAXR
VIFR
VIMR
VITR
VPTD
VSND
XANG
XFMR
XFTR
YF IN
YFMR
YFTR
YMRF
YTRF
ZANG
ZFTA
ZFEL
ZFMR
ZFTR
ALCYP
ALF IN
ALLF IN
ALLRG
ALRWG
APAMT
ARAMT
ARAYT
AYAMT
CDELE
CDF IN
CDLWG
CDMG
CLACL
CLCLE
CLF IN
CLLWG
CLRWG
CNBCL
CNPCL
CNRCL
CNRLC
CNLKS
CWING
DDELE
FNSWC
GVFTR
LLJET

LQJFY
 LWJNG
 NLJFY
 NLJFY
 NLJFY
 NRJFY
 PMQNM
 PMREL
 PMRPG
 PTDPM
 PRDPM
 PRDPM
 RPIST
 RSWING
 TDOEL
 VMAKF
 WGCOL
 XAFIN
 XAFIN
 XAFUS
 XAJET
 XKFLE
 XKFIFN
 XKFUS
 XFGUN
 XFLWG
 XFRNG
 YAELE
 YAERO
 YAFIN
 YAFUS
 YALWG
 YARWG
 YFFIN
 YFFUS
 YFGUN
 ZAFLE
 ZAFIN
 ZAFUS
 ZAJET
 ZFELE
 ZFFUS
 ZFGUN
 ZFLWG
 ZFRNG
 ALEFCRI
 ALGFPO

APRJET
ARRJFT
AYBJET
CNCPD
CNPDCD
COLJET
COLSTK
DZMGFL
DZMGFL
FIZETA
FSTAOMX
HAFPLI
HMGUSTF
HMGUSTG
PWGELI
PWGHKI
RACRWING
SWINER
VENIFR
VGUSTE
VGUSTM
VIMVER
XAPYLD
ZFLJET
ZFRJET
VALJET
VARJET
VFLJET
VFRJET
VGUSTF
VGUSTM
ZAPYLD
ZFLJET
ZFLWGI
ZFRJET

CLCD

CLCD

STAN
C3
C4
DCH
YAERO

SWAS

SWAS

MANAL
PED
YZM
YZY
TLM
TIT
YZM
YZT
CZET
YZMS
YZTS
TIMS
TITS
YZMS
YZTS
XLNK
CLOCK
CYCR1
CYCR2
CZET4
CZET6
CZET9
FLOCK
RANGE
SZET5
SZET7
SZET8
XLOCK
BOTTOM
CZET11
CZET12
CZET13
SZET10
TCLOCK

WROT

Lucy

YCPULY
1004
105N
105N
YPARY

FORCE
STFIMA
STAMAN
MANAL
ROMAN
MAPARO
STANRO
TOPLTY
I I
T T
V V
Y Y
AY AY
OL OL
QM QM
ON ON
OM OM
VM VM
XF XF
XV XV
YF YF
YY YY
ZF ZF
ZZ ZZ
AIR AIR
AIR AIR
APD APD
APF APF
ARD ARD
ARE ARE
AYD AYD
AYE AYE
AV1 AV1
A1W A1W
A1M A1M
A1M A1M
DT1 DT1
DT2 DT2
GVV GVV
IND IND
IX7 IX7
QWQ QWQ
PCC PCC
S00 S00
QME QME
QMX QMX
OPR OPR
QGO QGO

TZTY
T1MT
T2TT
T2YT
TZTA
ZZTA
APBMT
APTDD
AR8MT
ARTTD
AY8MT
AZETA
BETAD
BETAEE
BETAZ
BETAO
DELT2
DIXIZ
DIYIX
DIZIY
DPIXZ
DT8MT
DTZMT
DTZMI
DTZTI
GVERT
HDELTY
HU8KP
HU8KR
ISTOP
ITORS
KTCIR
KNVARB
KNVARS
OMEGM
OMPSA
ORMASS
TOELTY
THROT
TRALT
TRIND
TSTAB
TWQPI
VZETA
VZFLWG
ZF8WG
ZFMAX2

MANU

VARI

VARI

FORCE	COLL	HLTR1	RDELT2
STRIB	COSE	HLTR2	RUDIND
STRIMA	CYCF	HUBKI	TCLOCK
STAMAN	CYCL	HUBKA	TRIND2
MANAL	OPSI	HUBKP	VZETAT
ROMAN	EXIT	HUBKR	ZETATR
MANARD	KCIT	ISTOP	
TOPLOT	LGUN	KREAD	
I	NGUN	OMECH	
T	NGUN	PDPHI	
X	NPSI	PEDAL	
Y	PEDA	QMSA	
AY	PSDT	TDALT	
HL	OMAX	TRIND	
7F	QMS	VZETA	
AGH	TAXL	WCOL	
APD	TAXR	XAGUN	
APE	TIME	XARSP	
AVI	TZMS	XFGUN	
ALW	TZTS	XLOCK	
RLM	TIMS	YAGUN	
DTI	TLTS	YARSP	
DT2	T2MS	YFGUN	
GOV	T2TS	ZAGUN	
KMI	XCIT	ZARSP	
KPD	XMAI	ZFGUN	
PED	XMBI	ALECR1	
PSD	ZETA	ALGFPD	
OPC	ALCYP	AZETAT	
QQQ	ALERT	BETAZD	
T2M	ALGEZ	BETAZS	
T7T	ALGE1	COLSTK	
T1W	ALGE2	CYPNIC	
TIT	APBMT	CYSTK1	
T2M	AYAMT	CYSTK2	
T2T	AYDMX	DELT2R	
XAR	AZETA	HALFPI	
YAP	BETAD	HUBKPS	
ZAP	BETAN	HUBKTP	
ALGF	BETAX	HUBKTR	
APRG	BETAZ	TBRAKE	
ARPG	CGSTA	KONFIG	
ASEP	CLOCK	NPRINT	
AYRG	CPNIC	OMECHD	
AITR	CYCRI	PCGMAX	
BETA	CYCR2	PCRATE	
BITR	FLOCK	PSD550	
CGWL	HDELT	PSIREF	

PCG

PCG

OPC
HDEL T
OMEGM
PCDEL
OMEGMO
PCGDFD
PCGNAX
PCRATE

GUST

GUST

STAMAN
MANAL
ROMAN
MANARD
O
XX
YY
APE
ARE
AVE
QWG
KAP
YAR
ZAR
XAWG
ZAWG
CHING
GMAXV
HGUST
RATE1
RATE2
STOP2
VGUST
XAFLE
XAFIN
XGUST
YAFIN
YGUST
ZAFLE
ZAFIN
GMAXV1
GMAXV2
GMAXV3
GUSTYP
HGUSTE
HGUSTF
HGUSTW
LNGTH1
PLGHI
STAPT2
VGJSTE
VGJSTW
YSTAHM
YSTAHT
YJSTF
YGUSTW
YSTAHM
YSTAHT

TILT

YALJET
YARJET
ZAPYLD

TILT

STAMAN
MANAL
HL
RC
CGBL
CZET
SZET
XAMG
XLNK
ZAMG
CZET4
CZET6
CZET9
RANGE
SZET5
SZET7
SZET8
XAELE
XAFIN
XAFUS
XAGUN
XAJET
XAPYL
XARSP
YAELE
YAFIN
YAFUS
YAGUN
YALWG
YARSP
YARWG
ZAELE
ZAFIN
ZAFUS
ZAGUN
ZAJET
ZAPYL
ZARSP
BOTTOM
CZET11
CZET12
CZET13
EIMAST
EIZETA
HLPYLD
P71DTR
SZET10
XAPYLD

WRFM

WRFM

FORCE
ROMAN
A
XMA1
XMB1
XMA1T
XMB1T

STAB

STAB

FORCE
STRIAB
STRIMA
MANAL
ROMAN
MANARO
STANRO
TNPLOT
E
J
O
V
W
BM
PD
OL
QM
ON
XF
YF
ZF
APD
APE
ARD
ARE
AYD
AYE
AIM
BTR
BTM
DT1
DT2
HMR
HTR
ITM
KMI
PCC
PSD
QMX
QTR
QMG
SPD
TMR
TTR
TZN
TZY
TIM
TIT

T2M
T2T
VXB
VVB
VZB
XFM
XXD
YFM
YYD
ZZM
ZZD
APTO
ARTD
ALTR
BLTR
COLL
CYCF
CYCL
CZET
DPSI
DTRR
EPDS
EXIT
LINK
NPSI
PEDA
QSVI
SZET
TAXL
TAXR
THRS
TTRS
TZMT
TZTT
TMT
TMTT
TMTT
TMTT
TMTT
VIMR
VITR
XANG
XMAI
XMBI
YMRF
YTRF
ZETA
AIBPM
AIGPT

AIBRM
AIBRT
APBMT
APTID
ARBMT
ARTID
AYBMT
AIBAL
BETAE
BNPSI
BIBAL
CLOCK
CWING
DTZMT
DTZMI
DTZTI
PEDAL
RANGE
SWING
TRIND
TSTAB
XAELE
XMAIT
XMBIT
ASECOL
BETAES
COLSTK
CYSTKI
CYSTK2
DODCOL
HNPSTIR

L MODE

L MODE

STRIAB
STANRO
IV
PD
DTR
SPD
YEL
YWG
MASS
OELF
VSND
DTRRSQ
PWGFL1

LAMODE

STRIAB
IX
IZ
PD
SPD
XFS
MASS

SETE

SETE

FORCE
STRIAB
MANARO
A
E
PD
HMR
HTR
KMI
OMX
QTR
TMR
TTR
OSV1
TMR5
TTRS
YMRP
YTRF
BETAE
BETAES

JACOBI

JACOBI

STRIAB
MANARO
TOPLOT
F PD
APE
ARE
AVE
AIM
BIM
EPD
KMI
OMX
QTR
TMR
TTR
AATR
BITR
DEPD
EXIT
KVAR
QSVI
TMRS
TTRS
BETAE
PEDAL
RETAES
COLSTK
CYSTK1
CYSTK2
DQDCOL

AJAC08

FORCF
STRIAR
STRIMA
MANAL
ROMAN
MANARO
STANRO
TOPLOT
F
J
DL
DM
DN
DX
DY
DZ
PD
QL
QM
QN
XF
YF
ZF
AGW
APF
ARF
AYE
AIM
RIM
DTI
DT2
K41
PED
TZM
TZT
TIM
TIT
T2M
T2T
VXB
VVR
VZB
XKD
YYD
ZZD
ALGF
AITR
BITR

AJAC08

CYCF
CYCL
EXIT
LINK
PEDA
TAXL
TZMT
TZTT
TIMT
TITT
T2MT
T2TT
XMA1
XMB1
ALCYP
ALGEZ
ALGE1
ALGE2
COND1
CPWIC
CYCR1
CYCR2
DTZMT
DTZM1
DTZT1
PEDAL
TRIND
WGCOL
XMAIT
XMBIT
ALECR1
ALGFPD
ASECOL
COLSTK
CYPWIC
CYSTK1
CYSTK2
RUDIND

OFFTRM

OFFTRM

STRIAB
STRIHA
ROMAN
MANARO
V
Y
DL
DM
DN
DX
DY
DZ
APD
APF
ARD
ARE
AYD
AYE
IXZ
VXB
VYB
VZB
APEP
APTD
ARTD
AYFP
MASS
ZETA
APBMT
APTID
ARBMT
ARTID
AYBMT
DIXIZ
DIYIX
DIZIY

MRVP

MRVP

MANARO
HMR
HTR
QMX
QTR
TMS
TTR
KVAR
VIMR
VITR
YMRF
YIRF
BETAO

TRIM

DIST
DPSI
EPDX
EXIT
LINK
NPSI
PFDA
PSDT
QMRS
TAXL
TAXR
TIME
THRS
TTRS
YFIN
ZFEL
APTTD
ARTTD
AVEFP
BETAE
BNPSI
NPART
PDPHI
PEDAL
RANGE
TDELT
TZERO
YFFIN
ZFELE
BETAES
COLSTK
CYSTK1
CYSTK2
GEARAT
MNPSIR
KONFIG
PILGH2
ZDELT1

TRI-4

FORCE
STRIB
STRIMA
MANAL
ROMAN
MANARO
STANRO
TOPLOT
V
X
Y
AY
RM
DL
DM
DN
DX
DY
DZ
PD
APD
APF
ARD
ARE
AYD
AYF
AIM
ATR
BIM
IND
ITM
PSD
QMP
OMX
QTP
TMP
TTR
VXR
VVR
VZR
XIT
APTD
ARTD
AYFP
A1TR
A1TR
CYCF
CYCL

PARA

XFELE
XFFIN
XFLWG
XFRWG
YFFIN
ZFELE
ZFLWG
ZFRWG
COLSTK
CYSTK1
CYSTK2
ENGRPH
GEARAT
KONFIG
PSD30P
PSD550
RUDIND
ZETATR

PARA

FORCE
STRIAB
STRIMA
MANAL
ROMAN
MANARO
TOPLOT
PD
VH
AIR
APF
ARE
AYE
A1W
B1W
HMR
HTR
K41
OMX
QTR
TMR
TTR
ZZD
ALFL
ALTR
B1TR
CGWL
DTRR
EXIT
OMAX
TAXL
TAXR
TZMT
TZTT
T1MT
T1TT
T2MT
T2TT
VMRF
VTRF
ZETA
ALFIN
ALLWG
ALRWG
CGSTA
FKTIS
NPASS
PEDAL

SOLVE

SOLVE

STRIAB
TOPLOT
X
KMI
EXIT
POPHI

DAMPER

DAMPER

STRIAB
EPD
DEPD
EPDX
XMIN
XLIM:1

ITRIM

ITRIM

XLIMIT

STPIAB
MANAL
MANARO
SIANRO
TOPLOY
F
J
W
X
Y
PH
PD
APE
APE
AYF
ALM
RTD
BIM
ERR
ITM
KMI
TMR
TTR
VXB
VVR
VZR
XEC
ALTR
BITR
DAMP
EPDX
EXIT
TAXL
TAXD
TMR5
TTRS
AYEFP
RETAE
CONOI
NPASS
POPHI
PEDAL
RETAES
CPISTK
CYSTK1
CYSTK2
HALFPI
MXPASS

IVAR

IVAR

STRIMA
ROMAN
PSD
QMR
COLL
CYCF
CYCL
DTRR
KCIT
PEDA
PSDT
XCIT
RETAN
GMAXV
HURKI
HUBKM
HURKP
HUBKR
KREAD
PIU30
RATE1
RATE2
STOP2
XGUST
GMAXV1
GMAXV2
GMAXV3
HUBKTP
HUBKTR
LNGTH1
PTLGH1
PSISTP
OXRRAK
START2

PPLOT

PPLOT

TOPLOT
AH
AL
TPSN
NPART
NTIME
NVARA
NVARB
NVARC
NPRINT
NSCALE

CALL

CALL

TOPLOT
ICOM
IPSN
NSCALE

CURVET

CURVET

TIPULT
AL
HVARA
HVARB
HVARC

FORCE

LRJET
MLJET
MRJET
NLJET
NRJET
XFELE
XFFIN
XFFUS
XFGUN
XFLWG
XFRWG
YFFIN
YFFUS
YFGUN
ZFELE
ZFFUS
ZFGUN
ZFLWG
ZFRWG
XFLJET
XFRJET
YFLJET
YFRJET
ZFLJET
ZFRJET

FORCE

FORCE
A
OL
OM
ON
OF
OF
ZF
LWR
LTR
MWR
MTR
NMP
NTR
XEW
YEW
ZEW
LELE
LEIN
LEUS
LGUN
LLWG
LQWR
LQTR
LRWG
MELE
MEIN
MEUS
MGUN
MLWG
MQWR
MQTR
MRWG
NELE
NEIN
NEUS
NGUN
NLWG
NQWR
NQTR
NRWG
XEW
XETR
YEW
YETR
ZEW
ZETR
LLJET

STRIAB

MLCG
XCON
XJET
XMIN
AYEFP
CNPCD
GUFSS
NPASS
POPHI
SIACG
TZERO
BETAES
DODCOL
DIRRSO
ENGRPM
MKPASS
PSD30P
TRIND1
XLIMIT

STRIAB

STRIAB
D
F
F
X
NL
DM
DN
DT
DX
DY
DZ
IX
IY
IZ
PJ
QTR
EPD
ERR
KMI
RHO
PI2
SPD
XBW
XEL
XEP
XFC
XFN
XFS
XGN
XIT
XMR
XTR
XWG
YEL
YFN
YMR
YTR
YWG
BLCG
DAMP
DEPD
EPDS
EPDX
MASS
OSVI
THRS
TTRS

STRIMA

PSD550
PSISTP
OXBRK
RUDIND
ZDELT1
ZDELT2

STRIMA

STRIMA
AY
VH
AGW
DT1
DT2
TXZ
QMR
XXD
YYD
ZZD
ALGF
APFP
CGWL
COLL
CYCF
CYCL
DIST
KCIT
PEDA
QMAX
QMR5
TIME
TMAX
XCIT
ALGEZ
ALGF1
ALGE2
CGSTA
CPWIC
DIXIZ
DIYIX
DIZIY
DTZMT
DTZM1
DTZT1
FTKTS
HURKI
HURKM
KREAD
PIU30
TSTA9
ZMAX2
ZMAX3
ASECOL
CYPWIC
GEARAT

ANDJIT

ANDJIT

ANDJIT
AI
HJ
XK
YY
VI2
VI4
APDM
APDS
APFM
ARDM
ARDS
APFM
AYFM
PFAC
PFAC
POTJ
XK43
XLIM
APDBS
ARDBS
CBFAC
GDISK
NOPSI
TANA1
TANB1
TANT1
TANT2
X4QMD
XMMML
DCAFXX
IPRINT
NOPADL
SHFARD
SHEARL
SHFARR

STAMAN

YGUST
ZAGUN
ZAPYL
ZARSP
BETAZS
DELT2R
ETMAST
GPRED
HLPYLD
IRRAKE
OMEGMD
PCGDED
PCGMAX
PCRATE
POIDTR
QBRAKE
RDELT1
RDELT2
RITORS
TRIND2

STAMAN

STAMAN
HL
RC
XX
YY
AY1
GOV
KPN
QPC
QOO
RIY
APBG
ARRG
ASFP
AYBG
BWTG
BWTM
CGRL
CQSE
DPIX
DPIZ
FMPT
R550
ALERT
AYDMX
DELT2
DPIXZ
DTRWT
HDELT
HGUST
HLTR1
HLTR2
ISTOP
ITOPS
KTCTR
OMEGM
PCDEL
QMRSA
RMASS
TRALT
TWPI
VGUST
XAGUN
XAPYL
XARSP
YAGUN
YARSP

MANAL

XAJET
XLOCK
YAFIN
ZAELE
ZAFIN
ZAFUS
ZAJET
ALECRI
ALGFPD
BOTTOM
CZET11
CZET12
CZET13
EIZETA
HALFPI
SZET10
TCLOCK
XAPYLD
YGUSTW
ZAPYLD
ZFLNG1

MANAL

MANAL
Q
AP
PED
QMG
TZM
TZT
T1M
T1T
T2M
T2T
ALEL
CZET
PSDD
SZET
SZET
TAXL
TAXR
XAMG
XLNK
ZAMG
ALCYP
ALFIN
ALLWG
ALRWG
CDELE
CDFIN
CDLWG
CDRWG
CLELE
CLFIN
CLLWG
CLOCK
CLRWG
CWING
CYCR1
CYCR2
CZET4
CZET6
CZET9
FLOCK
RANGE
SZET5
SZET7
SZET8
WGCOL
XAELE
XAFIN
XAFUS

ROMAN

XSTANT
YSTAMH
YSTANT

ALBRT
APTTD
ARTTD
AZETA
BETAD
BETAN
BETAX
BETAZ
BNPSI
COND2
GMAXV
HUBKP
HUBKR
RATE1
RATE2
STOP2
THROT
TRIND
VZETA
XGUST
XMAIT
XMRIT
*XSTAH
*YSTAH
*AZETAR
AZETAT
BETAZD
GMAXV1
GMAXV2
GMAXV3
GUSTYP
HNPST
*HUBKPR
*HUBKPS
*HUBKRR
*HUBKRS
HUBKTP
HUBKTR
HURTPS
HUBTRS
KONFIG
LNGTH1
PILGH1
PSIREF
START2
*VZETAR
VZETAT
XSTAMH

ROMAN

ROMAN
*R
T
*OR
RM
*T1
*T2
ZZ
AIB
ATR
ORM
PCC
PSD
RTR
*TZR
VXS
VYS
VZS
*XMA
*XMB
*AIBP
*AIBR
APDO
*APOR
APTD
ARD
*ARDR
ARTD
AYDD
BETA
DPSI
OTRR
NPST
ORTR
PSDT
*PSID
TZMT
TZTT
T1MT
T1TT
T2MT
T2TT
XMA1
XMB1
ZZTR
AIRPM
AIRPT
AIRRM

MANARD

MANARD

HGUSTE
HGUSTF
HGUSTM
*THRUST
*TORQUE
VGUSTE
VGUSTM
*YFORCE
YGUSTF
ZETATO

MANARD
I
V
ADN
APE
APD
APE
AYD
AYE
AIM
RIM
HMR
HTR
IND
QMX
QTP
TMR
TTR
*VI2
VXB
VYB
V7B
XAR
YAR
ZAP
ALTR
H1TR
GFWJ
GLAT
NWAG
VIMR
VITR
YMR
YTRF
ZETA
APBMT
ARBMT
AYBMT
BETAE
BETAJ
GVERT
PEDAL
TDELT
*ZFTAR
COLSTK
CYSTK1
CYSTK2
*MFJRC

STANRO

STANRO

STANRO
#B
J
W
RM
BTR
ITM
VHS
LINK
*PMOM
OELE
*RMOM
VROT
VSND
VFIN
ZFEL
AIRAL
BIBAL
COND1
PMOMM
PMOMT
RMOMM
RMOMT
SWING
PILGH2
PWGEL1

ROSTAR

ROSTAR

AM
CT
*ER
OI
XB
ALT
ADR
ERM
*ERX
EXH
NXR
RBH
SWC
UHS
COHB
ERTR
ERXM
ERT
LROT
RAIB
RTRP
TATR
CONEK
OCAFR
FVIND
NVARO
SWR1
SWR2
TIP1B
TIP3B
TWIST
CLRADK
DELTA3
LAMBDA
UPGUST
URGUST
UTGUST
WROTOR
*XLIMAX
*XLIMIN
XLMAXM
XLMAXT
XLMINH
XLMINT

TOPLOT

TOPLOT

TOPLOT
AH
AL
EXIT
ICDH
IPSN
NPART
NTIME
NVARA
NVARB
NVARC
NVAR
NPRINT
NSCALE

STARAN

CNPCD2
COLJET
DXWGL
DZWGL
ETAOX
PWGKI
RCWING
SWINGH
VENTER
VXWVER
VALJET
VARJET

STARAN

STARAN
RH
C2
C4
RW
CLP
CLP
JCD
DQL
NON
VW
VES
RAB
CLRD
CNRD
ETAO
NJET
QFIN
T7MS
T7TS
TIMS
TITC
T2MS
T2TS
VIFR
CLBCL
CNRCL
CNPC
CNRCD
CNRCL
COLKS
D3ELF
FNSWC
LWING
PMREL
PMRWG
PTRFN
RP1ST
VMAXE
YAFLE
YAERO
YAFUS
VALWG
YARWG
APBJET
ARBJET
AYBJET
CNPCD1

APPENDIX D
SUBROUTINES CONTAINING EACH VARIABLE, BY COMMON

VARIABLE		FORCE		T		E		R		M		P		A		C		S		D		I		I		P		P		B		U		C	
FORCE		T		E		R		M		P		A		C		S		D		I		I		P		P		B		U		C			
A																																			
QL																																			
Q4																																			
QN																																			
XF																																			
YF																																			
ZF																																			
LWR																																			
LTR																																			
MWR																																			
MTR																																			
NWR																																			
NTR																																			
XFW																																			
YFW																																			
ZFW																																			
LELE																																			
LELE																																			
LFIN																																			
LFUS																																			
LGUN																																			
LLWG																																			
LQMR																																			
LQTR																																			
LRWG																																			
MELE																																			
MFIN																																			
MFUS																																			
MGUN																																			
MLWG																																			
MOHR																																			
MQTR																																			
MRWG																																			
NELE																																			
NFIN																																			
NFUS																																			
NGUN																																			

VARIABLE	C	S	R	C	M	T	I	N	I	O	T	R	O	O	L	D	S	T	U	I	R	G	S	L	F	A	O	O	E	D	B	O	R	M	A	E	J	F	F	V	P	M	A	E	R	D	I	T	P	C	C						
FORCE																																																									
LRJET																																																									
MLJET																																																									
NRJET																																																									
NRJET																																																									
XFELE																																																									
XFFIN																																																									
XFFUS																																																									
XFGUN																																																									
XFLWG																																																									
XFRWG																																																									
YFFIN																																																									
YFFUS																																																									
YFGUN																																																									
ZFELE																																																									
ZFFUS																																																									
ZFGUN																																																									
ZFLWG																																																									
ZFRWG																																																									
XFLJET																																																									
XFRJET																																																									
YFLJET																																																									
YFRJET																																																									
ZFLJET																																																									
ZFRJET																																																									

FORCE

VARIABLE		STRIAB																														
STRIAB		C	S	R	C	M	T	I	N	R	M	I	V	P	G	T	M	S	L	S	J	A	D	M	T	P	S	D	I	P	C	C
D																																
F																																
F																																
X																																
DL																																
DM																																
DN																																
DT																																
DX																																
DY																																
DZ																																
IX																																
IY																																
IZ																																
PD																																
DTR																																
EPD																																
ERR																																
KM1																																
RHM																																
PI2																																
SPD																																
XBW																																
XEL																																
XER																																
XFC																																
XFN																																
XFS																																
XGN																																
XIT																																
XMR																																
XTR																																
XWG																																
YEL																																
YFN																																
YMR																																
YTR																																
YMG																																
BLCG																																
DAMP																																

VARIABLE	C	S	R	E	O	N	E	M	I	O	D	A	C	S	M	I	V	P	G	T	W	S	L	S	J	A	D	W	T	P	S	D	I	I	P	C	C
STRIAB																																					
MLCG																																					
XCON																																					
XJET																																					
XMIN																																					
AYEFP																																					
CNPGD																																					
GUESS																																					
NPASS																																					
PDPHI																																					
STACG																																					
TZERO																																					
RETAFS																																					
DQDCOL																																					
DTRRSQ																																					
ENGRPH																																					
MPASS																																					
PSD30P																																					
TRINDI																																					
XLINIT																																					

STRIAB

[illegible]

88

STAMAN

VARIABLE
STAMAN
YGUST
ZAGUN
ZAPYL
ZARSP
BETAZS
DEL T2R
EIMAST
GPRED
HLPYLO
I BRAKE
QMEGMD
PCGOED
PCGMAX
PCGRATE
POLDTR
QBRAKE
RDELJ1
ROELT2
RITORS
TRIN02

VARIABLE	MANAL	MAJET	XLOCK	YAFIN	ZAFLE	ZAFIN	ZAFUS	ZAJET	ALECR1	ALGFPD	BOTTOM	CZET11	CZET12	CZET13	EIZETA	HALFPI	SZET10	TCLOCK	XAPYLD	YGUSTW	ZAPYLD	ZFLMG1
MANAL	X	X	X																			
MAJET	X	X	X																			
XLOCK	X	X	X																			
YAFIN	X	X	X																			
ZAFLE	X	X	X																			
ZAFIN	X	X	X																			
ZAFUS	X	X	X																			
ZAJET	X	X	X																			
ALECR1																						
ALGFPD																						
BOTTOM																						
CZET11																						
CZET12																						
CZET13																						
EIZETA																						
HALFPI																						
SZET10																						
TCLOCK																						
XAPYLD																						
YGUSTW																						
ZAPYLD																						
ZFLMG1																						

C	S	R	C	M	T	I	V	R	I	D	A	C	S	W	M	I	V	P	G	T	W	S	L	L	A	E	J	A	O	W	T	P	S	D	I	I	P	C	G
8	T	E	O	M	I	N	I	O	T	O	N	L	W	R	A	M	A	C	G	I	R	T	M	L	A	E	J	A	O	W	T	P	S	D	I	I	P	C	G
I	A	A	N	E	N	R	N	T	R	R	A	C	A	O	N	I	R	G	T	F	F	A	O	D	E	B	O	R	I	B	M	X	X	X	X	X	X	X	
R	O	I	M	I	O	O	N	T	T																														
T	I																																						
VARIABLE																																							
ROMAN																																							
XSTAHM																																							
XSTAHM																																							
YSTAHM																																							
YSTAHM																																							

ROMAN

VARIABLE	C	S	R	C	M	T	I	V	R	I	D	A	C	S	M	I	V	P	G	T	W	S	L	S	J	A	O	M	T	P	S	D	I	P	C	C
MANARO	X							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
HGUSTE								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
HGUSTF								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
HGUSTW								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
*THRUST								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
*TORQUE								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
VGUSTW								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
*YFORCE								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
YGUSTF								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
ZETATr								X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

MANARO

TOPLOT

APPENDIX E
PROGRAM SECTIONS CONTAINING EACH VARIABLE, BY COMMON

	C	S	R	A	M	S	T	P
	R	T	O	N	A	T	R	P
	I	A	T	A	N	A	I	L
	R	A	L	U	B	M	O	T
	T	N						
VARIABLE	X	X	X	X	X	X	X	X
FORCE	X	X	X	X	X	X	X	X
STRIAB	X	X	X	X	X	X	X	X
STKIMA	X	X	X	X	X	X	X	X
ANDUIT	X	X	X	X	X	X	X	X
STAMAN	X	X	X	X	X	X	X	X
MANAL	X	X	X	X	X	X	X	X
POMAN	X	X	X	X	X	X	X	X
MANARJ	X	X	X	X	X	X	X	X
STAMPJ	X	X	X	X	X	X	X	X
PJSTAR	X	X	X	X	X	X	X	X
TOPLOT	X	X	X	X	X	X	X	X
STARAN	X	X	X	X	X	X	X	X

C S R A M S T P
 9 T O N A T R P
 I A T A N A I L
 T N R A L U B M T

VARIABLE
 FORCE
 A
 OL
 OM
 ON
 OF
 OF
 ZF
 LMR
 LTP
 MTP
 MTR
 NMR
 NTR
 XFW
 YFW
 ZFW
 LELE
 LETN
 LFUS
 LGUN
 LLWG
 LQWR
 LQTR
 LRWG
 MELE
 MEIN
 MEUS
 MGUN
 MLWG
 MQMR
 MOTO
 MOWG
 NELE
 NEIN
 NEUS
 NGUN
 NLWG
 NQMR
 NQTR
 NRWG
 XEMP
 XETO
 YEMP
 YETR
 ZEMP
 ZETO
 IJST

FORCE

	C	S	R	A	M	S	T	P
	R	T	O	N	A	T	R	P
	I	A	T	A	N	A	I	L
	T	R	A	L	U	B	M	O
	T	N						
VARIABLE								
FJRC	X							
LRJET	X	X	X	X				
MLJET	X	X	X	X				
MRJET	X	X	X	X				
NLJET	X	X	X	X				
NRJET	X	X	X	X				
XFFLE	X							
XFFIN	X							
XFFUS	X							
XFGUN	X	X						
XFLWG	X	X						
XFRWG	X	X						
YFFIN	X	X						
YFFUS	X	X						
YFGUN	X	X						
ZFELE	X	X						
ZFFUS	X	X						
ZFGUN	X	X						
ZFLWG	X	X						
ZFRWG	X	X						
XFLJFT	X	X						
XFRJFT	X	X						
YFLJFT	X	X						
YFRJFT	X	X						
ZFLJFT	X	X						
ZFRJFT	X	X						

FORCE

CSRAMSTP
 0TONAAIL
 1ATAAAIL
 1RALUBMO
 T N

VARIABLE

STRIAB

D

E

F

X

DL

DM

DN

DT

DX

DY

DZ

IX

IY

IZ

PD

OTR

EPD

ERR

KM1

RHO

R12

SPD

XBH

XEL

XER

XEC

XFN

XFS

XGN

XIT

XMR

XTR

XWG

YEL

YFN

YMR

YTR

YMG

BLCG

DAMP

QEPD

EPDS

EPDX

MASS

OSV1

TMRS

TTRS

STRIAB

	C	S	R	A	M	S	T	P
	R	T	O	N	A	T	R	P
	I	A	T	A	N	A	I	L
	P	A	L	U	B	M	O	
	T	N						
VARIABLE	X	X	X	X	X	X	X	X
STRIA3								
WLCG								
XCON								
XJET								
XMIN								
AYEFP								
CNPCD								
GUESS								
NPASS								
POPHI								
STACG								
TZERO								
BETAES								
DQDCOL								
DTRRSQ								
ENGRPM								
MXPASS								
PSD30P								
TRINDI								
XLIMIT								

STRIAB

VARIABLE	C	S	R	A	M	S	T	P
STRIMA	8	T	O	N	A	T	R	P
AY	1	A	T	A	N	A	I	L
VH	R	A	L	U	B	M	O	T
STRIMA	X							
AY		X	X	X	X	X	X	X
VH		X	X	X	X	X	X	X
AGW		X	X	X	X	X	X	X
DFI		X	X	X	X	X	X	X
DT2		X	X	X	X	X	X	X
IXZ		X	X	X	X	X	X	X
QMR		X	X	X	X	X	X	X
XXD		X	X	X	X	X	X	X
YYD		X	X	X	X	X	X	X
ZZD		X	X	X	X	X	X	X
ALGF		X	X	X	X	X	X	X
APFP		X	X	X	X	X	X	X
AYEP		X	X	X	X	X	X	X
CGWL		X	X	X	X	X	X	X
COLL		X	X	X	X	X	X	X
CYCF		X	X	X	X	X	X	X
CYCL		X	X	X	X	X	X	X
DIST		X	X	X	X	X	X	X
KCIT		X	X	X	X	X	X	X
PEDA		X	X	X	X	X	X	X
QMAX		X	X	X	X	X	X	X
QMS		X	X	X	X	X	X	X
TIME		X	X	X	X	X	X	X
TMAX		X	X	X	X	X	X	X
XCIT		X	X	X	X	X	X	X
ALGEZ		X	X	X	X	X	X	X
ALGF1		X	X	X	X	X	X	X
ALGE2		X	X	X	X	X	X	X
CGSTA		X	X	X	X	X	X	X
CPWIC		X	X	X	X	X	X	X
DIXIZ		X	X	X	X	X	X	X
DIVIX		X	X	X	X	X	X	X
DIZIY		X	X	X	X	X	X	X
DTZMT		X	X	X	X	X	X	X
DTZM1		X	X	X	X	X	X	X
DTZT1		X	X	X	X	X	X	X
FKTS		X	X	X	X	X	X	X
HJJKI		X	X	X	X	X	X	X
HURK4		X	X	X	X	X	X	X
KRFAD		X	X	X	X	X	X	X
PIU3C		X	X	X	X	X	X	X
TSTAB		X	X	X	X	X	X	X
ZMAX2		X	X	X	X	X	X	X
ZMAX3		X	X	X	X	X	X	X
ASFCOL		X	X	X	X	X	X	X
CYPWIC		X	X	X	X	X	X	X
GEARAT		X	X	X	X	X	X	X

STRIMA

C S R A M S T P
 8 T O N A T R P
 1 A T A N A I L
 T R A L U R M O
 T N

VARIABLE
 STRIMA
 PSD57
 PSISTP
 OXBRK
 RJIND
 ZDEL1
 ZDEL2

STRIMA

X X X X
 X X X X
 X X X X
 X X X X
 X X X X
 X X X X
 X X X X

C S R A M S T P
 8 T O M A T R P
 1 A T A N A I L
 T R A L U B M O
 Y

VARIABLE	AND01T	X
A1		X
B1		X
XK		X
XV		X
VI2		X
VI4		X
APDH		X
APDS		X
APFM		X
AROM		X
ARDS		X
ARFM		X
AYFM		X
PFAC		X
RFAC		X
ROTJ		X
XK43		X
XLIM		X
APDBS		X
ARDBS		X
CBFAC		X
GDISK		X
NOPS1		X
TANA1		X
TANB1		X
TANT1		X
TANT2		X
XMOMD		X
XMOHL		X
OCAFXX		X
IPRINT		X
NORAOL		X
SHEARD		X
SHEARL		X
SHEARR		X

P P L O T
 T R I M
 S T A B
 M A N U
 A N A L
 S R O T A L
 C 9 I A R T

111

VARIABLE	C	S	P	A	M	S	T	P
	R	T	O	:	A	T	R	P
	I	A	T	A	N	A	I	L
	R	A	L	U	B	M	O	
	T	N						
STAMAN	X							X
YGUST	X							X
ZAGIN	X							X
ZAPYL	X							X
ZASP	X							X
RETAZS	X							X
DEL128	X							X
ETMAST	X							X
GPPELD	X							X
HLPYLD	X							X
LRRAKE	X							X
CMESND	X							X
PCGDED	X							X
PCGMAX	X							X
PCRATF	X							X
PCIDTR	X							X
URRAKE	X							X
SDELTI								X
EDFLT2								X
RITOPS								X
TPIND2								X

STAMAN

MANAL

VARIABLE
MANAL
Q
AD
PED
OWG
TZM
TZT
TLM
TIT
TZY
TZT
ALEL
CZFT
PSDD
SZET
TAXL
TAXR
XAWG
XLNK
ZAWG
ALCYP
ALFIN
ALLWG
ALRWG
CDELE
COFIN
COLWG
CORWG
CLFLE
CLFIN
CLLWG
CLOCK
CLRWG
CWING
CYCR1
CYCR2
CZET4
CZET6
CZET9
FLOCK
RANGE
SZET5
SZET7
SZET8
MGCOL
XAELE
XAFIN
XAFUS

VARIABLE	CS	RA	MS	ST	P
MANAL	X	X	X	X	X
XAJET	X	X	X	X	X
XLOCK	X	X	X	X	X
YAFI	X	X	X	X	X
ZAELE	X	X	X	X	X
ZAEIN	X	X	X	X	X
ZAFUS	X	X	X	X	X
ZAJET	X	X	X	X	X
ALECR1	X	X	X	X	X
ALGFPD	X	X	X	X	X
BOTTOM	X	X	X	X	X
CZET11	X	X	X	X	X
CZET12	X	X	X	X	X
CZET13	X	X	X	X	X
EIZETA	X	X	X	X	X
HALFPI	X	X	X	X	X
SZET13	X	X	X	X	X
TCLOCK	X	X	X	X	X
XAPYLD	X	X	X	X	X
YGUSTW	X	X	X	X	X
ZAPYLD	X	X	X	X	X
ZFLWGI	X	X	X	X	X

MANAL

ROMAN

VARIABLE	CS	ST	RA	MA	STR	P
ROMAN	X	X	X	X	X	X
*R	X	X	X	X	X	X
T	X	X	X	X	X	X
*OR	X	X	X	X	X	X
RM	X	X	X	X	X	X
*T1	X	X	X	X	X	X
*T2	X	X	X	X	X	X
ZZ	X	X	X	X	X	X
AIB	X	X	X	X	X	X
AIR	X	X	X	X	X	X
ORM	X	X	X	X	X	X
PCC	X	X	X	X	X	X
PSD	X	X	X	X	X	X
RT	X	X	X	X	X	X
*TZR	X	X	X	X	X	X
VXS	X	X	X	X	X	X
VYS	X	X	X	X	X	X
VZS	X	X	X	X	X	X
*XMA	X	X	X	X	X	X
*XMB	X	X	X	X	X	X
*AIBP	X	X	X	X	X	X
*AIBR	X	X	X	X	X	X
APDD	X	X	X	X	X	X
*APDR	X	X	X	X	X	X
APT	X	X	X	X	X	X
AQDD	X	X	X	X	X	X
*AROR	X	X	X	X	X	X
AQTO	X	X	X	X	X	X
AYDD	X	X	X	X	X	X
BETA	X	X	X	X	X	X
DPSI	X	X	X	X	X	X
DYRR	X	X	X	X	X	X
NPSI	X	X	X	X	X	X
ORTK	X	X	X	X	X	X
PSDT	X	X	X	X	X	X
*PSID	X	X	X	X	X	X
TZMT	X	X	X	X	X	X
TZTT	X	X	X	X	X	X
TMT	X	X	X	X	X	X
TITT	X	X	X	X	X	X
T2MT	X	X	X	X	X	X
T2TT	X	X	X	X	X	X
XMA1	X	X	X	X	X	X
XMB1	X	X	X	X	X	X
ZZTR	X	X	X	X	X	X
AIBPM	X	X	X	X	X	X
AIBPT	X	X	X	X	X	X
AIBRM	X	X	X	X	X	X

VARIABLE	C	S	R	A	M	S	T	P
ROMAN	X	X	X	X	X	X	X	X
AIART	X	X	X	X	X	X	X	X
APTTD	X	X	X	X	X	X	X	X
ARTTD	X	X	X	X	X	X	X	X
AZETA	X	X	X	X	X	X	X	X
BETAD	X	X	X	X	X	X	X	X
BETAN	X	X	X	X	X	X	X	X
BETAX	X	X	X	X	X	X	X	X
BETAZ	X	X	X	X	X	X	X	X
BNPSI	X	X	X	X	X	X	X	X
CND2	X	X	X	X	X	X	X	X
GMAXV	X	X	X	X	X	X	X	X
HUBKP	X	X	X	X	X	X	X	X
HUBKR	X	X	X	X	X	X	X	X
RATE1	X	X	X	X	X	X	X	X
RATE2	X	X	X	X	X	X	X	X
STP2	X	X	X	X	X	X	X	X
THROT	X	X	X	X	X	X	X	X
TRIND	X	X	X	X	X	X	X	X
VZETA	X	X	X	X	X	X	X	X
XGUST	X	X	X	X	X	X	X	X
XMAIT	X	X	X	X	X	X	X	X
XMRIT	X	X	X	X	X	X	X	X
*XSTAH	X	X	X	X	X	X	X	X
*YSTAH	X	X	X	X	X	X	X	X
*AZETAR	X	X	X	X	X	X	X	X
AZETAT	X	X	X	X	X	X	X	X
RETAZD	X	X	X	X	X	X	X	X
GMAXV1	X	X	X	X	X	X	X	X
GMAXV2	X	X	X	X	X	X	X	X
GMAXV3	X	X	X	X	X	X	X	X
GUSTV2	X	X	X	X	X	X	X	X
HNPSTR	X	X	X	X	X	X	X	X
*HUBKPR	X	X	X	X	X	X	X	X
HUBKPS	X	X	X	X	X	X	X	X
*HUBKRQ	X	X	X	X	X	X	X	X
HUBKPS	X	X	X	X	X	X	X	X
HUBKTP	X	X	X	X	X	X	X	X
HUBKTR	X	X	X	X	X	X	X	X
HUBTPS	X	X	X	X	X	X	X	X
HU3TPS	X	X	X	X	X	X	X	X
KONFIG	X	X	X	X	X	X	X	X
LNGLHI	X	X	X	X	X	X	X	X
PLGLHI	X	X	X	X	X	X	X	X
PSIREF	X	X	X	X	X	X	X	X
START2	X	X	X	X	X	X	X	X
*VZETAR	X	X	X	X	X	X	X	X
VZETAT	X	X	X	X	X	X	X	X

ROMAN

C S R A M S T P
 R T C I N A T R P
 I A T A N A I L
 T P A L U B M O
 T

VARIABLE
 ROMAN
 XSTAH
 XSTAH
 YSTAH
 YSTAH

ROMAN

CSRAHSTP
 8TONATRP
 1ATAAILL
 T RALUBMO
 T N

VARIABLE

MANARO X X X X X X
 I X X X X X
 V X X X X X
 APD X X X X X
 APE X X X X X
 ARD X X X X X
 ARE X X X X X
 AYD X X X X X
 AYE X X X X X
 LIM X X X X X
 BIM X X X X X
 HMR X X X X X
 HTR X X X X X
 INO X X X X X
 QHX X X X X X
 QTR X X X X X
 TMR X X X X X
 TIR X X X X X
 *VIR X X X X X
 VXB X X X X X
 VYB X X X X X
 VZB X X X X X
 XAR X X X X X
 YAR X X X X X
 ZAR X X X X X
 ALTR X X X X X
 BLIR X X X X X
 GFWD X X X X X
 GLAT X X X X X
 NMAG X X X X X
 VMR X X X X X
 VTR X X X X X
 YMR X X X X X
 YTRF X X X X X
 ZETA X X X X X
 APMT X X X X X
 ARMT X X X X X
 AYMT X X X X X
 BETAE X X X X X
 RETAO X X X X X
 GVERT X X X X X
 PEDAL X X X X X
 TDELT X X X X X
 *ZETAR X X X X X
 COLSTK X X X X X
 CVSTK1 X X X X X
 CVSTK2 X X X X X
 *HFORCE X

MANARO

CSRAMSTP
8TONATRP
1ATANAILL
YRALUBMT

VARIABLE
MANARJ
HGUSTE
HGUSTF
HGUSTW
*THRUST
*TORQUE
VGUSTE
VGUSTW
*YFORCE
YGUSTF
ZETATR

X X X X X X
X X X X X
X X X X X
X X X X X
X X X X X
X X X X X
X X X X X
X X X X X
X X X X X
X X X X X
X X X X X
X X X X X

X

MANARO

VARIABLE	STANP7	*R	J	W	RM	BTp	ITM	V4S	LINK	*PMOM	QELF	*RMOM	VRUT	VSUD	YFIN	ZFFI	ATRAL	BIRAL	CNDI	PMOMM	PMOMT	PMOMM	PMOMT	PMOMM	PMOMT	SWING	PILCH?	PMCELT
CSRAMSTPP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
STONATRP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
IATAAILL	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
IPALUBMOT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
TNT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

STANRO

C S R A M S T P
 R T O N A T R P
 L A T A N A I L
 T R A L U B M O T

VARIABLE

ROSTAR

ROSTAR X X
 A4 X X X
 CT X X X
 *ER X X
 PI X X X
 XB X X X
 ALT X X X
 ADR X X X
 ERM X X X
 *ERX X X
 EXH X X
 NXR X X
 RBH X X
 SWC X X
 UHS X X
 CDHR X X
 ERTR X X
 ERXH X X
 ERXT X X
 LROT X X
 RAIB X X
 RTRP X X
 TAIR X X
 CONEK X X
 DCAFR X X
 FVIND X X
 NWARD X X
 SWKR1 X X
 SWKR2 X X
 TIP18 X X
 TIP38 X X
 TWIST X X
 CLRADK X X
 DELTA3 X X
 LAMBDA X X
 UPGUST X X
 URGUST X X
 UTGUST X X
 WROTOR X X
 *XLIMAX X X
 *XLIMIN X X
 XLMAXM X X
 XLMAXT X X
 XLMINM X X
 XLMINI X X

CSRAMSTP
 STONATRP
 LATANAAIL
 RALUBMO
 TM

VARIABLE

TOPLOT	X	X	X	X	X	X	X	X	X
AH	X								
AL	X								
EXIT	X	X	X	X	X	X	X	X	X
ICOM	X	X							
IPSN	X	X							
NPART	X	X							
NTIME	X								
NVARA	X								
NVARB	X	X							
NVARC	X	X	X						
NVAPS	X								
NPRINT	X								
NSCALE	X								

TOPLOT

CSRAMSTP
 BTOMATRP
 IATA MAIL
 RALUBMT
 T N

VARIABLE
 STARAN
 CNPCD?
 COLJET
 DXWGL
 DZGFL
 ETAOMX
 PWGKI
 RCHING
 SWINGH
 VENTER
 VXRVER
 YALJET
 YARJET

STARAN

APPENDIX F
FORTRAN LISTING


```

C      A VALUE OF 7 FOR NPART RESULTS IN THE CALCULATION OF STABILITY
C      DERIVATIVES.
C
C      7 CONTINUE
C      CALL START
C      IF(EXIT.NE.O.) GO TO 13
C      CALL TRIM
C      IF(EXIT.NE.O.) GO TO 13
C      CALL STAB
C      GO TO 13
C
C      AN NPART VALUE OF 10 RESULTS IN A PARAMETER SWEEP USING TRIM OR
C      STABILITY DERIVATIVES ONLY.
C
C      10 CONTINUE
C      CALL START
C      IF(EXIT.NE.O.) GO TO 70
C      CALL TRIM
C      IF(EXIT.NE.O.) GO TO 70
C      IF(NVARA.NE.O) CALL STAB
C      IF(EXIT.NE.O.) GO TO 70
C      GO TO 13
C
C      A VALUE OF 11 FOR NPART RESULTS IN A LEAST SQUARES CURVE FIT OF
C      TIME HISTORY DATA.
C
C      11 CONTINUE
C      REWIND 3
C      CALL CURVET
C      GO TO 13
C      60 WRITE (6,1000)NPART
C      70 STOP
C      900 FORMAT (14I5)
C      1000 FORMAT (1M1,I8X,'BELL HELICOPTER 1RM OS/350 PROGRAM ASAJ01',
C      1      1H 17X39HELICOPTER RIGID BODY DYNAMICS ANALYSIS////////
C      2      23H DATA ERROR .. NPART = ,I5)
C      1001 FORMAT (12,X,I3,X,I1,3(I5,X,2F5.0))
C      1002 FORMAT (1M1)
C      2000 FORMAT (17A4)
C      2003 FORMAT (1M0,17X,17A4////////)
C      END

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C0101090
C0101100
C0101110
C0101120
C0101130
C0101140
C0101150
C0101160
C0101170
C0101180
C0101190
C0101200
C0101210
C0101220
C0101230
C0101240
C0101250
C0101260
C0101270
C0101280
C0101290
C0101300
C0101310
C0101320
C0101330
C0101340
C0101350
C0101360
C0101370
C0101380
C0101390
C0101400
C0101410
C0101420
C0101430
C0101440
C0101450
C0101460
C0101470
C0101480
C0101490

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SUBROUTINE AJACOB		
COMMON	/FORCE/	
1	XF,XFRWG,XFLWG,XFELE,XFEUS,XFRJET,	AJAC0010
2	XF3JET,XFMR,XFTR,XFGUN,XFFIN,XFM,	AJAC0020
3	YF,YFFUS,YFRJET,YFLJET,YFMR,YFTR,	AJAC0030
4	YFGUN,YFFIN,YFM,	AJAC0040
5	ZF,ZFRWG,ZFLWG,ZFELE,ZFEUS,ZFRJET,	AJAC0050
6	ZFLJET,ZFMR,ZFTR,ZFGUN,ZFM,	AJAC0060
7	QL,LRWG,LLWG,LELE,LFUS,LRJET,LLJET,	AJAC0070
8	LNR,LTR,LGUN,LFIN,LQMR,LQTR,	AJAC0080
9	QM,MRWG,MLWG,MELE,MFUS,MRJET,MLJET,	AJAC0090
10	NMR,NTR,MGUN,MFIN,NOMR,NQTR,	AJAC0100
11	QN,NRWG,NLWG,NELE,NFUS,NRJET,NLJET,	AJAC0110
12	NMR,NTR,MGUN,MFIN,NOMR,NQTR,	AJAC0120
13	QN,NRWG,NLWG,NELE,NFUS,NRJET,NLJET,	AJAC0130
14	DL,DM,DN,DX,DY,DZ,IX,IY,IZ,PD(10,11),	AJAC0140
15	DTR,EPD,ERR(10),KM,RMD,	AJAC0150
16	R12,SPD(6,6,3),XBM(21),XEL(14),	AJAC0160
17	XER(7),XFC(21),XFN(7),XFS(35),	AJAC0170
18	XGN(7),XIT(21),XMR(49),XTR(49),	AJAC0180
19	XMG(21),YMR(21),YTR(21),YMG(21),	AJAC0190
20	YEL(21),YFN(21),BLCG,DAMP,DEPD(10),	AJAC0200
21	EPDS,EPDX(10),MASS,QSV1,TMRS,TTRS,	AJAC0210
22	WLG,XCON(63),XJET(14),XMIN,AYEFP,	AJAC0220
23	BETAES(2),CNPCD,DHADDQ,DYBDR,GUESS,	AJAC0230
24	NPASS,PDPI(11,11),STACC,TZERO,	AJAC0240
25	XMAST,DHADAQ,DDCOL,DTRSQ,DYBDR,	AJAC0250
26	ENGRPM,NXPASS,PSD3OP,TAINDI,XLIMIT	AJAC0260
27	AY,VH,AGM,DT(2),DT2(2),IXZ,	AJAC0270
28	QMR,XXD,YD,ZD,ALGF,APFP,AYFP,	AJAC0280
29	CGNL,COLL(6),CYCF(3),CYCL(3),	AJAC0290
30	DTST,KCIT(20),PEDA(3),OMAX,	AJAC0300
31	QMR3,TIME,TMAX,KCIT(20,6),ALGEZ,	AJAC0310
32	ALGE1,ALGE2,CGSTA,CPWIC,DIXIZ,	AJAC0320
33	DIYIX,DTZ1Y,DTZMT,DTZM1,DTZT1,FTRTS,	AJAC0330
34	HUBKM(2,2),HUBKI(2,2),	AJAC0340
35	KREAD,PIU30,TSTAB(14),ZMAX2,ZMAX3,	AJAC0350
36	ASECOL,CYPWIC,GEARAT,PSD550,	AJAC0360
37	PSISTP,OXBRK,RUDIND,ZDELT1,ZDELT2	AJAC0370
38	Q,AP,PED,OMG,TZM,TIM,TZM,	AJAC0380
39	TZT,T1T,T2T,ALEL,CZET,PSDD,	AJAC0390
40	SZET,TAXL,TAXR,XANG,XLNR(16),ZANG,	AJAC0400
41	ALCYP,ALFIN,ALLWG,ALRWG,CDELE,CDFIN,	AJAC0410
42	CDLWG,CDRWG,CLELE,CLFIN,CLLWG,CLRWG,CWING,	AJAC0420
43	CYCR1,CYCR2,CZET4,CZET6,CZET9,RANGE,	AJAC0430
44	SZET5,SZET7,SZET8,WGCOL,XAELE,XAFIN,	AJAC0440
45	XAFUS,XAJET,YAFIN,ZAELE,ZAFIN,ZAFUS,	AJAC0450
46	YAELE,YAFUS,YALWG,YARWG,YALJET,YARJET,	AJAC0460
47	ZAJET,ALECR1,ALGFPD,BOTTOM,CZET11,	AJAC0470
48	CZET12,CZET13,ETZETA,HALFPI,SZET10,	AJAC0480
49	XAPYLD,YGUSTM,ZAPYLD,ZFLWG1,ZFRWG1	AJAC0490
50	,TZMS,T1MS,T2MS,TZTS,T1TS,T2TS,	AJAC0500
51	CLOCK,FLOCK,XLOCK,TCLOCK	AJAC0510
52	ZZ,VXS(2),VYS(2),VZS(2),BETA(12,2),	AJAC0520
53	T,PCC(2),C0SE(17,7,2),BETAM(2),BETAX(2),BETAZ(2),	AJAC0530
54		AJAC0540

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*      AIB(2),APDD,ARDD,AYDD,AIR(2),
1      DPSI(12,2),OTRR,MPSI(2),ZZTR,
2      BETAD(12,2),BNPSI(2),
3      COMD2,GMAXV,RATE1,RATE2,STOP2,
4      THROT(2),TRIND,XGUST,BETAZD(2),GMAXV1,
5      GMAXV2,GMAXV3,GUSTYP,HMPSTR(2),
6      HUBKPS,HUBKRS,HUBTPS,HUBTRS,
7      KONFIG,LNGTH1,PILGH1,PSIREF(2),
8      START2,XMOMLI(12,2),
9      RM,RTM,ORM,ORTM,TMT,TITT,
A      T2MT,T2TT,TZMT,TZTT,XMAL,XMAL1,
B      XMB1,XMB1T,AIBPH,AIBPT,AIBRM,AIBRT,
C      APTD,APTD,ARTD,ARTD,PSD,PSDT,
D      XSTAHM,XSTAHM,YSTAHM,YSTAHM,
E      HUBKP,HUBKTP,HUBKR,HUBKTR
F      ,AZETA,AZETAT,VZETA,VZETAT
COMMON /MANARO/ I,V,IND,MWAG,APBMT,ARBMT,AYBMT,BETA0(2),TDELT,
1      BETAE(2),HGUSTE,HGUSTF,HGUSTM,VGUSTE,
2      VGUSTM,VGUSTF,GFMD,GLAT,GVERT,
3      VXB,VZB,APD,VYB,ARD,AYD,
4      COLSTK,CYSTK1,CYSTK2,PEDAL,AYE,
5      APE,ARE,AIM,BIM,AITR,BITR,
6      XAR(2),YAR(2),ZAR(2),
7      VIMR,VITR,ZETA,ZETATR,HMR,HTR,
8      TMR,TTR,OMX,OTR,YMRF,YTRF
COMMON /STANRO/ J,M,ITM,VHS(2),LINK,OELE,VROT(2),
1      VSND,YFIN(2),ZFEL(2),AIBAL(2),
2      B1BAL(2),COND1,SWING,PILGH2,PMGEL1,
3      BM,8TR,PHOMM,PHOMT,PHOMM,RHOMT
COMMON /TOPLOT/ AH(3),AL(3),EXIT,ICOM(49),IPSN,
1      NPART,NVARA,NVARB,NVARC,NSCALE
2      ,NVAR,NPRINT,NTIME
DIMENSION VAR(11)
EQUIVALENCE (VAR(1),COLSTK)
CYCR1=CYSTK1*CYCF(3)+CYCF(2)
CYCR2=CYSTK2*CYCL(3)+CYCL(2)
PED= PEDAL*PEDA(3)+PEDA(2)
WCOL=CPWIC*COLSTK+AGW
ALECR1=ALGEZ+CYCR1*(ALGE1+ALGE2*CYCR1)
ALCYP=CYPWIC*CYCR2
ALGFPD=ALGF+RUDIND*PED
CALL SWAS(COLSTK)
TZMT=TZM+DTZM1+DTZMT+ASECOL
TZTT=TZT+DTZT1+TRIND*(DTZMT+ASECDL)
T1MT=T1M+DT1(1)
T1TT=T1T+DT1(2)
T2MT=T2M+DT2(1)
T2TT=T2T+DT2(2)
CALL RATS (XXD,YYD,ZZD,AYE,APE,ARE,VXB,VYB,VZB,-1)
IF(LINK.EQ.2) CALL OFFTRM
CALL ANAL
IF(EXIT.NE.0.) RETURN

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AJACD550
AJAC0560
AJACD570
AJACD580
AJACD590
AJAC0600
AJAC0610
AJAC0620
AJAC0630
AJAC0640
AJAC0650
AJAC0660
AJAC0670
AJAC0680
AJAC0690
AJACD700
AJAC0710
AJAC0720
AJAC0730
AJAC0740
AJAC0750
AJAC0760
AJAC0770
AJAC0780
AJAC0790
AJAC0800
AJAC0810
AJAC0820
AJAC0830
AJAC0840
AJAC0850
AJAC0860
AJAC0870
AJAC0880
AJAC0890
AJAC0900
AJAC0910
AJAC0920
AJAC0930
AJACD940
AJAC0950
AJAC0960
AJAC0970
AJAC0980
AJAC0990
AJAC1000
AJAC1010
AJAC1020
AJAC1030
AJAC1040
AJAC1050
AJAC1060
AJAC1070
AJAC1080

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F(1) = XF - DX
F(2) = YF - DY
F(3) = ZF - DZ
F(4) = ON - DN
F(5) = OM - DM
F(6) = OL - DL
F(7)=XMB1
F(8)=XMA1
F(9)= XMB1T
F(10)=XMA1T
IF(COND1.LE.1.5.AND.J.NE.1) RETURN
IF(COND1.LE.1.5.AND.LINK.EQ.3) RETURN
IF(COND1.EQ.0.) RETURN
CALL WRVP (1,VAR,KM1,PD,TAXL,TAXR)
CALL WRFM
PFT JPN
CN)

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AJAC1090
AJAC1100
AJAC1110
AJAC1120
AJAC1130
AJAC1140
AJAC1150
AJAC1160
AJAC1170
AJAC1180
AJAC1190
AJAC1200
AJAC1210
AJAC1220
AJAC1230
AJAC1240
AJAC1250

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SUBROUTINE ANAL		
COMMON /FORCE/	XF, XFRWG, XFLWG, XFELE, XFFUS, XFRJET,	ANAL0010
1	XFLJET, XFMR, XFTR, XFGUN, XFFIN, XFM,	ANAL0020
2	YF, YFFUS, YFRJET, YFLJET, YFMR, YFTR,	ANAL0030
3	YFGUN, YFFIN, YFM,	ANAL0040
4	ZF, ZFRWG, ZFLWG, ZFELE, ZFFUS, ZFRJET,	ANAL0050
5	ZFLJET, ZFMR, ZFTR, ZFGUN, ZFM,	ANAL0060
6	OL, LRWG, LLWG, LELE, LFUS, LRJET, LLJET,	ANAL0070
7	LMR, LTR, LGUN, LFIN, LQMR, LOTR,	ANAL0080
8	OM, MRWG, MLWG, MELE, MFUS, MRJET, MLJET,	ANAL0090
9	MMR, MTR, MGUN, MFIN, MQMR, MQTR,	ANAL0100
A	ON, NRWG, NLWG, NELE, NFUS, NRJET, NLJET,	ANAL0110
B	NMR, NTR, NGUN, NFIN, NOMR, NQTR	ANAL0120
COMMON /MANAL/	O, AP, PED, ONG, TZM, TIM, T2M,	ANAL0130
1	TZT, T1T, T2T, ALEL, CZET, PSDD,	ANAL0140
2	SZET, TAXL, TAXR, XAWG, XLNK(116), ZAWG,	ANAL0150
3	ALCYP, ALFIN, ALLWG, ALRWG, CODEL, CDFIN,	ANAL0160
4	COLWG, CORWG, CLELE, CLFIN, CLLWG, CLRWG, CMING,	ANAL0170
5	CYCR1, CYCR2, CZET4, CZET6, CZET9, RANGE,	ANAL0180
6	SZET5, SZET7, SZET8, WGCOL, XAELE, XAFIN,	ANAL0190
7	XAFUS, XAJET, YAFIN, ZAELE, ZAFIN, ZAFUS,	ANAL0200
8	YAELE, YAFUS, YALWG, YARWG, YALJET, YARJET,	ANAL0210
9	ZAJET, ALECR1, ALGPPD, BOTTDH, CZET11,	ANAL0220
A	CZET12, CZET13, ETZETA, HALFPI, SZET10,	ANAL0230
B	XAPYLD, YGUSTW, ZAPYLD, ZFLWG1, ZFRWG1	ANAL0240
C	, TZMS, TIMS, T2MS, T2TS, T1TS, T2TS,	ANAL0250
COMMON /MANAPD/	CLOCK, FLOCK, XLOCK, TCLOCK	ANAL0260
1	I, V, IND, MAG, APMT, ARMT, AYBMT, BETAO(2), TDELT,	ANAL0270
2	BETA(2), HGUSTE, HGUSTF, HGUSTW, VGUSTE,	ANAL0280
3	VGUSTW, YGUSTF, GFMD, GLAT, GVERT,	ANAL0290
4	VXB, VZB, APD, VYB, ARD, AYD,	ANAL0300
5	COLSTK, CYSTK1, CYSTK2, PEDAL, AYE,	ANAL0310
6	APE, ARE, AIM, B1M, A1TR, B1TR,	ANAL0320
7	XAR(2), YAR(2), ZAR(2),	ANAL0330
8	VIMR, VITR, ZETA, ZETATR, HMR, MTR,	ANAL0340
COMMON /STANRD/	TMR, TTR, OMX, OTR, YNRF, YTRF	ANAL0350
1	J, M, ITM, VHS(2), LTM, OELE, VRDT(2),	ANAL0360
2	VSND, YFIN(2), ZFEL(2), A1BAL(2),	ANAL0370
3	B1BAL(2), CDND1, SWING, PILGH2, PMGEL1,	ANAL0380
COMMON /TOPLOT/	RM, BTR, PHDMM, PMOHT, RMOMM, RMOMT	ANAL0390
1	AH(3), AL(3), EXIT, ICOM(49), IFSN,	ANAL0400
2	NPART, NVARA, NVARB, NVARC, NSCALE	ANAL0410
COMMON /STARAN/	, NVARS, NPRT, NTIME	ANAL0420
1	RH(2), C3, C4, RM, CLP, CLR, DCD, DOL, DQM, VIM,	ANAL0430
2	SAIB(2), CLBD, CNRD, ETAO, NJET,	ANAL0440
3	QFIN,	ANAL0450
4	VIER, CLBCL, YFS(114),	ANAL0460
5	CNBCL, CNPCL, CNRCD, CNRCL, COLKS, D3ELE,	ANAL0470
6	FNSWC, LWING, PMREL, PMRWG,	ANAL0480
7	PTRFN, RP1ST, VMAXF, YAERD(31,5),	ANAL0490
8	APBJET, ARBJET, AYBJET,	ANAL0500
9	CNPCI1, CNPCD2, COLJET, DXWCEL, NZWCEL,	ANAL0510
A	ETAOMX, PMGWK1, RCWING, SWINGH,	ANAL0520
B	VENTER, VXMVFR	ANAL0530
C		ANAL0540

```

COMMON /FORV/ Y(4,150)
REAL LELE, LFIN, LGUN, LHURK, LHURKT, LLJET, LLWG, LMR,
1 LOMR, LOTR, LRJET, LRWG, LTR, MELE, MFIN, MFUS,
2 MGUN, MHURKT, MLJET, MMR, MPYL, MQMR,
3 MOTR, MRJET, MRWG, MTR, NELE, NFIN, NFUS, NGUN, NLWG,
4 NHURK, NHURKT, NLJET, NLWG, NMR, NOMR, NOTR, NRJET,
5 NRWG, NTR, LFUS, NFEUS, MFUS
V3=0.
MP=WCOS(APE)
XFW=-W*SIN(APE)
YFW=WP*SIN(ARE)
ZFW=WP*COS(ARE)
GFWD=(XFW-XF)*RW
SLAT=(YFW-YF)*RW
GVERT=(ZFW-ZF)*RW
IF(BM.EQ.0.) GO TO 300
CALL ROTAN (1)
IF(EXIT.NE.0.) RETURN
CALL RATS (-HMR,YMRF,-TMR,0.,-ZETA,0.,XFMR,YFMR,ZFMR,1)
CALL DOGS (XAR(1),VAR(1),ZAR(1),XFMR,YFMR,ZFMR,LMR,MMR,NMR)
QREACT=OMX+BATB(1)*PSDD
CALL MICE (0.,QREACT,-ZETA,LOMR,NQMR,-1)
PMOMH=PMOMH+RH(1)
CALL RATS (RMOMH,PMOMH,0.,0.,-ZETA,0.,LHURK,MMHR,NHURK,1)
LOMR=LOMR+LHURK
NQMR=NQMR+NHURK
IF(VROT(1).NE.0.) V3=(VHS(1)/VROT(1))*3
300 IF(BTR.EQ.0.) GO TO 299
CALL ROTAN (2)
IF(EXIT.NE.0.) RETURN
CALL RATS (-HTR,YTRF,-TTR,AYBMT,APBMT,ARBMT,XFTR,YFTR,ZFTR,1)
CALL DOGS (XAR(2),VAR(2),ZAR(2),XFTR,YFTR,ZFTR,LTR,MTR,NTR)
QREACT=OTR+BATB(2)*PSDD
CALL RATS (0.,0.,-QREACT,AYBMT,APBMT,ARBMT,LOTR,MOTR,NOTR,1)
PMOMH=PMOMH+RH(2)
RMOMH=RMOMH+RH(2)
CALL RATS (RMOMH,PMOMH,0.,0.,AYBMT,APBMT,ARBMT,LHURKT,MHURKT,NHURKT,
1 1)
LOTR=LOTR+LHURKT
MOTR=MOTR+MHURKT
NOTR=NOTR+NHURKT
299 XMAC=V*VSND
AP=0.
APDOT=0.
VXZBSQ=VX8**2+VZ8**2
IF(VXZBSQ.EQ.0.) GO TO 303
AP=ATAN2(VZ8,VX8)
APDOT=(VX8*Y(1,78)-VZ8*Y(1,76))/VXZBSQ
C WING EQUATIONS
C
C
303 CONTINUE
ANGE=0.

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ANAL0550
 ANAL0560
 ANAL0570
 ANAL0580
 ANAL0590
 ANAL0600
 ANAL0610
 ANAL0620
 ANAL0630
 ANAL0640
 ANAL0650
 ANAL0660
 ANAL0670
 ANAL0680
 ANAL0690
 ANAL0700
 ANAL0710
 ANAL0720
 ANAL0730
 ANAL0740
 ANAL0750
 ANAL0760
 ANAL0770
 ANAL0780
 ANAL0790
 ANAL0800
 ANAL0810
 ANAL0820
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 ANAL0840
 ANAL0850
 ANAL0860
 ANAL0870
 ANAL0880
 ANAL0890
 ANAL0900
 ANAL0910
 ANAL0920
 ANAL0930
 ANAL0940
 ANAL0950
 ANAL0960
 ANAL0970
 ANAL0980
 ANAL0990
 ANAL1000
 ANAL1010
 ANAL1020
 ANAL1030
 ANAL1040
 ANAL1050
 ANAL1060
 ANAL1070
 ANAL1080


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IF(QWG.LT.0) GO TO 304
VIM=VIMR*PHRWG
XXW=VXB-HGUSTW+VIM*SZET
ST1=VXB-VGUSTW-VIM*SZET
ANGRW=ATAN2(ST1,XXW)
ALGEO=ANGRW+WGCOL
ALRWG=ALGEO-ALCYP
CALL CLCD (ALRWG,CLRWG,CDRWG,XMAC,EXIT,3)
IF(EXIT.NE.0.) GO TO 1
CD=C3
CL=C4
DCDR=DCD
VELSO=XXW**2+ST1**2
ORW=QWG*VELSO
CALL MICE (-CDRWG,-CLRWG,ANGRW,C1,C2,1)
XFRWG=C1*ORW
ZFRWG=C2*ORW
CALL DOGS (XWGW,YARWG,ZAWG,XFRWG,0. ,ZFRWG,LRWG,NRWG,NRWG)
ALLWG=ALGEO+ALCYP
CALL CLCD (ALLWG,CLLWG,CDLWG,XMAC,EXIT,3)
IF(EXIT.NE.0.) GO TO 1
CD=.5*(C3+CD)
CLWG=.5*(C4+CL)
ALWG=.5*(ALRWG+ALLWG)
DCD=.5*(DCDR+DCD)
CALL MICE (-CDLWG,-CLLWG,ANGRW,C1,C2,1)
XFLWG=C1*ORW
ZFLWG=C2*ORW
CALL DOGS (XWGW,YALWG,ZAWG,XFLWG,0. ,ZFLWG,LLWG,MLWG,NLWG)
TS=SWINGH/SORT(VELSQ)
FF=ORW*SWING
YAW=0.
IF(VYB-YGUSTW.NE.0.-OR.XXW.NE.0.) YAW=ATAN2(VYB-YGUSTW,XXW)
DOL AND DON ARE CONTRIBUTION OF EACH WING. NOT TOTAL

DOL=FF*(YAW*(CLBD+CLBCL*CLWG)+TS*(AYD*CLR*CLWG+ARD*CLP))
DON=FF*(YAW*(CNBD+CNBCL*CLWG**2)+TS*(AYD*(CNRCL*CLWG**2+CNRCDD*DCD)
1 +ARD*(CNPCL*CLWG+CNPCD1+CNPCD2*ALWG)))
LRWG=LRWG+DOL
LLWG=LLWG+DOL
NRWG=NRWG+DON
NLWG=NLWG+DON
ANGE=-PWGEL1*CLWG
ANG1=0.
IF(VXB.NE.0.) ANG1=APDOT*XAELE*PWGEL1/VXB
IF(ALWG.EQ.0.) GO TO 305
ANGE=ANGE-ANG1*CLWG/ALWG
GO TO 306
305 CONTINUE
ANGE=ANGE-ANG1*YAERO(17,3)
306 CONTINUE
AWAKE=PWGKI*CLWG
NSTALL=RPISY*AMAX1(0.,(ALWG-YAERO(19,3)))

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ANAL1090
 ANAL1100
 ANAL1110
 ANAL1120
 ANAL1130
 ANAL1140
 ANAL1150
 ANAL1160
 ANAL1170
 ANAL1180
 ANAL1190
 ANAL1200
 ANAL1210
 ANAL1220
 ANAL1230
 ANAL1240
 ANAL1250
 ANAL1260
 ANAL1270
 ANAL1280
 ANAL1290
 ANAL1300
 ANAL1310
 ANAL1320
 ANAL1330
 ANAL1340
 ANAL1350
 ANAL1360
 ANAL1370
 ANAL1380
 ANAL1390
 ANAL1400
 ANAL1410
 ANAL1420
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 ANAL1600
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 ANAL1620

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ANAL1630
ANAL1640
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ANAL1700
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ANAL1900
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ANAL1920
ANAL1930
ANAL1940
ANAL1950
ANAL1960
ANAL1970
ANAL1980
ANAL1990
ANAL2000
ANAL2010
ANAL2020
ANAL2030
ANAL2040
ANAL2050
ANAL2060
ANAL2070
ANAL2080
ANAL2090
ANAL2100
ANAL2110
ANAL2120
ANAL2130
ANAL2140
ANAL2150
ANAL2160

XA=DXWGEL-DSTALL
ANGEL=ATAN2(DZWGEL,XA)
DWGEL=SQRT(XA**2+DZWGEL**2)*RCWING
ANGLE=AWAKE-AP-ANGEL
NIS=DWGEL*ABS(SIN(ANGLE))
XI=DWGEL*ABS(COS(ANGLE))
HWAKE=.68*SQRT(CD*(XI+.15))
ETAQ=0.
IF(DIS .LT. HWAKE .AND. ABS(ANGLE).LT.HALFPI)
1  ETAQ=ETAQMX*SQRT(CD)/(XI+.3)*(COS(DIS *HALFPI/HWAKE))**2
  IF(NWAG.EQ.0) GO TO 304
  LWING=LWING+1
  LWING1=LWING
  DLIFT=ZFRWG-ZFRWG1
  CALL WAG (CWING,LWING,3,V,TDELT,RED,DLIFT)
  ZFRWG=ZFRWG-RED
  DLIFT=ZFLWG-ZFLWG1
  CALL WAG (CWING,LWING1,4,V,TDELT,RED,DLIFT)
  ZFLWG=ZFLWG-RED

ELEVATOR EQUATIONS
304 IF(COLE.LT.0) GO TO 302
  VIER=0.
  IF(V.GT.VENTER) VIER=VIER*(V-VENTER)*VXWVER
  IF(V.GT.VMAXE) VIER=PMREL*VIMR
  ST1=VZB*ARD*YAELE-APD*XAELE-VIER*CIJET-VGJSTE
  XE=VXB*APD*ZAELE-AYD*YAELE-HGUSTE
  VELSO=XE**2+ST1**2
  IF(VFLSQ.NE.0.) ANGE=ATAN2(ST1,XE)*ANGE
  ALEL=ALECR1+D3ELE*COLSTR*EIZETA*ANGE
  CALL CLCD (ALEL,CLELE,CDELE,XMAC,EXIT,4)
  IF(EXIT.NE.0.) GO TO 1
  DE=DELE*VELSO*(1.-ETAQ)
  IF(ALFL.NE.0.) CLELF=CLELE*ALEL/(ALEL+CLELE*QE*YAERD(11,4))
  CALL MICE (-CDELE,-CLELE,ANGE,C1,C2,1)
  XFELE=C1*QE
  ZFELE=C2*QE
  CALL DDGS (XAELE,YAELE,ZAELE,XFELE,0. ,ZFELE,LELE,MELE,NELE)
  IF(NWAG.EQ.0) GO TO 302
  ZFEL(1)=ZFELE
  ZFEL(2)=ZFEL(1)+ZFEL(2)
  IF(1.NE.3) ZFEL(1)=ZFEL(2)

FIN EQUATIONS
307 IF(OFIN.LT.0) GO TO 301
  ST1=ARD*ZAFIN-AYD*XAFIN-VYB*FNSWC-VITR*PTRFN+YGUSTF
  XFN=VXB*APD*ZAFIN-AYD*YAFIN-HGUSTF
  QF=QFIN*(XFN*XXFN+ST1*ST1)
  ANGF=0.
  IF(QF.NE.0.) ANGF=ATAN2(ST1,XXFN)
  ALFIN=ANGF+ALGFPD
  CALL CLCD (ALFIN,CLFIN,CDFIN,XMAC,EXIT,5)

```

```

IF(EXIT.NE.0.) GO TO 1
IF(ALFIN.NE.0.) CLFIN=CLFIN*ALFIN/(ALFIN+CLFIN*OF*VAERO(11,5))
CALL MICE (-CDFIN,CLFIN,ANGF.C1,C2,-1)
XFFIN=C1*OF
YFFIN=C2*OF
CALL DOGS (XAFIN,YAFIN,ZAFIN,XFFIN,YFFIN,0.0, .LFIN,MFIN,MFIN)
IF(NMAG.EQ.0) GO TO 301
YFIN(2)=YFFIN
YFFIN=.5*(YFIN(1)+YFIN(2))
IF(1.NE.3) YFIN(1)=YFIN(2)
FUSFLAGE EQUATIONS
301 XXF=VXB-HGUSTM
ST1=VZB-VGUSTM
ANG1=0.
QVXZB=0*(XXF*XXF+ST1*ST1)
IF(QVXZB.NE.0.) ANG1=ATAN2(ST1,XXF)
FSLIFT=QVXZB*(YFS(1)+ANG1*YFS(2))
DF=QVXZB*(YFS(7)+ANG1*(YFS(8)+ANG1*YFS(9)))
ST2=YGUSTM-VYB
QVXYB=0*(XXF*XXF+ST2*ST2)
ANG2=0.
IF(QVXYB.NE.0.) ANG2=ATAN2(ST2,XXF)
YFFS=QVXYB*(YFS(10)+ANG2*(YFS(11)+ANG2*YFS(12)))
DFAY=QVXYB*YFS(13)+ANG2**2
CALL MICE (-DF,-FSLIFT,ANG1,XFFUS,ZFFUS,1)
CALL MICE (-OFAY,YFFS,ANG2,XFFUS,YFFUS,-1)
DPYLON=QVXZB*YFS(14)*V3
CALL MICE (-OPYLON,0.,ANG1,XFPYL,ZFPYL,1)
XFFUS=XFFUS+XFPYL*YFFUS
ZFFUS=ZFFUS+ZFPYL
CALL DOGS(XAPYLD,0.,ZAPYLD,XFPYL,0.,ZFPYL,TV,MPYL,TV1)
CALL DOGS (XAFUS,YAFUS,ZAFUS,XFFUS,YFFUS,ZFFUS,LFUS,MFFUS,MFFUS)
MFUS=QVXZB*(YFS(3)+ANG1*YFS(4))+MPYL*MFFUS
YFUS=QVXYB*(YFS(5)+ANG2*YFS(6))+MFFUS
JET THRUST EQUATIONS
IF(COLJET.EQ.0.) GO TO 79
DCOL=COLJET*(COLSTK-COLKS)
COLKS=COLSTK
TAXR=TAXR+OCOL
IF(NJET.EQ.1) GO TO 79
TAXL=TAXL+OCOL
79 CONTINUE
CALL RATS (TAXR,0.,0.,AYBJET,APBJET,XFRJET,XFRJET,ZFRJET,ZFRJET,1)
CALL DOGS (XAJET,YAJET,ZAJET,XFRJET,YFRJET,LRJET,MRJET,
1 NRJET)
CALL RATS(TAXL,0.,0.,-AYBJET,APBJET,XFLJET,XFLJET,ZFLJET,ZFLJET,1)
CALL DOGS (XAJET,YAJET,ZAJET,XFLJET,YFLJET,LLJET,MLJET,
1 NLJET)
FORCE EQUATIONS

```

ANAL2170
 ANAL2180
 ANAL2190
 ANAL2200
 ANAL2210
 ANAL2220
 ANAL2230
 ANAL2240
 ANAL2250
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 ANAL2280
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 ANAL2620
 ANAL2630
 ANAL2640
 ANAL2650
 ANAL2660
 ANAL2670
 ANAL2680
 ANAL2690
 ANAL2700

```

C
XF=XFRWG+XFLWG+XFELE+XFFUS+XFRJET+XFLJET+XFNMR+XFTR+XFGUN+XFFIN+XFWANAL2710
YF=YFRJET+YFLJET+YFNMR+YFTR+YFGUN+YFFIN+YFWANAL2720
ZF=ZFRWG+ZFLWG+ZFELE+ZFFUS+ZFRJET+ZFLJET+ZFNMR+ZFTR+ZFGUN+ZFFIN+ZFWANAL2730
MOMENT EQUATIONS
QL=LRWG+LLWG+LELE+LFUS+LRJET+LLJET+LMR+LTR+LGUN+LFIN+LQMR+LQTR
OM=NRWG+MLWG+MELE+MFUS+MRJET+MLJET+MMR+MTR+MGUN+MFIN+MQMR+MQTR
ON=NRWG+NLWG+NELE+NFUS+NRJET+NLJET+NNR+NNTR+NGUN+NFIN+NQMR+NQTR
ANAL2750
ANAL2760
ANAL2770
ANAL2780
ANAL2790
ANAL2800
ANAL2810
ANAL2820
ANAL2830
ANAL2840
1 RETURN
END
C
C
C
C

```

```

SUBROUTINE CATS (A1,A2,A3,B1,B2,B3,C1,C2,C3,N1,N2)
  A IS THE MATRIX OF THE A SET OF EULER ANGLES
  B IS THE MATRIX OF THE B SET OF EULER ANGLES
  C IS THE MATRIX OF THE C SET OF EULER ANGLES

  N1= 1, N2= 1 IS FOR B*A
  N1=-1, N2= 1 IS FOR B*(TRANSPOSE)
  N1= 1, N2=-1 IS FOR B*(TRANSPOSE)*A
  N1=-1, N2=-1 IS FOR B*(TRANSPOSE)*A(TRANSPOSE)

  DIMENSION A(3,3),B(3,3),C(3,3)
  COMPUTE A AND B MATRICES
  CALL MATRIX (A1,A2,A3,A,N1)
  CALL MATRIX (B1,B2,B3,B,N2)
  COMPUTE C MATRIX
  DO 101 I=1,3
  DO 101 J=1,3
  C(I,J)=0.
  DO 101 L=1,3
  C(I,J)=C(I,J)+B(L,J)*A(I,L)
101 CONTINUE
  CHECK TO SEE IF PITCH ANGLE IS 90 DEGREES
  IF(C(1,1).EQ.0..AND.C(1,2).EQ.0.) GO TO 104
  C1=ATAN2(C(1,2),C(1,1))
  C3=ATAN2(C(2,3),C(3,3))
  C2=ATAN2(C(2,3),C(3,3))
  GO TO 103
102 CONTINUE
  C2=ATAN2(-C(1,3),C(2,3)*SIN(C3))
103 CONTINUE
  CHECK TO SEE IF C1,C2,C3 ARE IN WRONG QUADRANT
  IF(COS(C2).GE.0.) RETURN
  RECOMPUTE C1,C2,C3 IN CORRECT QUADRANT
  C1=ATAN2(-C(1,2),-C(1,1))
  C3=ATAN2(-C(2,3),-C(3,3))
  IF(ABS(C3).LE.0.001) RETURN
  C2=ATAN2((-C(1,3)*COS(C3)),C(3,3))
  RETURN
  RESOLVE INDETERMINACY CAUSED BY PITCH ANGLE BY USING OLD
  YAW ANGLE
104 CONTINUE
  C2 = -SIGN(1.570796,C(1,3))
  C3=(ATAN2(-C(2,1),(-C(1,3)*C(3,1)))-C1)*C(1,3)
  RETURN
  END

```

```

SUBROUTINE CLC3 (ALP,CL,CO,XMAC,EXIT,N)
COMMON /STARAN/ RH(2),C3,C4,RW,CLP,CLR,DCD,DOL,DON,VTH,
1 BAIB(2),CLB0,CNRO,ETAQ ,NJET,
2 OFIN,
3 VIER,CLBCL,YFS(14),
4 CNBCL,CNPCL,CNRCJ,CN2CL,COLKS,03ELE,
5 FNSWC,LWING,PMREL,PMRWG,
6 PTRFN,RPIST,VMAXE,YAERO(31,5),
7 APBJET,ARBJET,AYBJET,
8 CNPCD1,CNPCD2,COLJET,OXWGL,0ZWGL,
9 ETAQMX,PMGK1,RCWING,SWINGH,
10 VENTER,VXWVER
11 DIMENSION HEAD(3,3)
12 DATA DTRR,PI,TWJPI/ 57.29578,3.141593,6.283185/
13 DATA HALFPI/1.570796/
14 DATA HEAD/
15 LOGICAL STALL
16 STALL=.FALSE.
17 ALF=ALP
18 AL=YAERO(17,N)
19 SG=1.
20 IF(ALF.LT.0.) SG=-1.
21 AMG=SG*ALF
22 IF(20.LE.AMG) GO TO 6015
23 IF(PI.GE.AMG) GO TO 6020
24 AMG=AMG-TWOPI
25 ALF=AMG*SG
26 GO TO 6010
27 WRITE (6,6101) N
28 EXIT=1.
29 RETURN
30 IF(AL.NE.0.) GO TO 50
31 ALD=AMG*DTRR
32 CALL TARTINT (CL,CO,XMAC,ALD,SG)
33 CL=CL*SG
34 RETURN
35 SMAC=1./SORT(ABS(1.-XMAC**2))
36 AL(=0.
37 CRM=YAERO(1,N)
38 SSMM=YAERO(2,N)
39 CDZ=YAERO(12,N)
40 CD1 = YAERO(13,N)
41 CD2 = YAERO(14,N)
42 COMX=YAERO(16,N)
43 SMALM = AMINI(XMAC,SSMM)
44 AR = YAERO(18,N)
45 ALD=ALP*DTRR
46 ZK3=1+.25*XMAC**4
47 IF((HALFPI).GE.AMG) GO TO 6032
48 AMG=PI-AMG
49 SG=-SG
50 CLZ=YAERO(7,N)
51 CLMX=CLZ+SMALM*(YAERO(8,N)+SMALM*(YAERO(9,N)+SMALM*YAERO(10,N)))
52 ALB=YAERO(23,N)

```

CLCD0010
CLCD0020
CLCD0030
CLCD0040
CLCD0050
CLCD0060
CLCD0070
CLCD0080
CLCD0090
CLCD0100
CLCD0110
CLCD0120
CLCD0130
CLCD0140
CLCD0150
CLCD0160
CLCD0170
CLCD0180
CLCD0190
CLCD0200
CLCD0210
CLCD0220
CLCD0230
CLCD0240
CLCD0250
CLCD0260
CLCD0270
CLCD0280
CLCD0290
CLCD0300
CLCD0310
CLCD0320
CLCD0330
CLCD0340
CLCD0350
CLCD0360
CLCD0370
CLCD0380
CLCD0390
CLCD0400
CLCD0410
CLCD0420
CLCD0430
CLCD0440
CLCD0450
CLCD0460
CLCD0470
CLCD0480
CLCD0490
CLCD0500
CLCD0510
CLCD0520
CLCD0530
CLCD0540

```

SALB=YAERD(21,N)
SZALB=YAERD(25,N)
CALB=YAERD(27,N)
GO TO 6031
6032 CLZ=YAERD(3,N)
CLMX=CLZ+SMALM*(YAERD(4,N)+SMALM*(YAERD(5,N)+SMALM*YAERD(6,N)))
ALB=YAERD(22,N)
SALB=YAERD(20,N)
SZALB=YAERD(24,N)
CALB=YAERD(26,N)
6033 IF(XMAC.LT.CRM) GO TO 6041
IF(SSMM.LE.XMAC) GO TO 6042
AL=YAERD(29,N)+XMAC*(YAERD(30,N)+XMAC*YAERD(31,N))
GO TO 5000
6041 AL=AL*SMAC
GO TO 5000
6042 AL=4.*SMAC
5000 ANG=AMG
ALPH14=CLMX/AL
SANG=SIN(ANG)
CANG=COS(ANG)
IF(N.LT.3) GO TO 11
F1=CLZ
F2=.81
GO TO 10
11 F1=.938
F2=.581
10 CONTINUE
IF(ALB.GT.AMG) GO TO 6044
STALL=.TRUE.
IF(XMAC.GT.1.0)ZK3=-.84+.082/(XMAC-.8)
IF(ABS(ANG).GE.1.565) GO TO 35
Q0=F1*ZK3
Q1=Q0+Q0
A=Q0*SIN(ANG+AMG)
Z2=.81+Q1*SANG-F2*ZK3
S02A=(AR-SANG*Q2+Q1*CANG**2)/(A+A)
COA=CANG*Q2/A
DISC=SQRT(S02A**2+COA)
IF(S02A.GT.0.) GO TO 31
ALI=DISC-R02A
GO TO 36
31 CONTINUE
ALI=COA/(R02A+DISC)
GO TO 36
35 ALI = 0.
36 CL = AR * ALI
GO TO 20
6044 ALI = AL/(AL+AR)*AMG
ANG=ANG-ALI
CL=AL*ANG
IF(CLMX.GE.CL) GO TO 20
Q0=F1*ZK3
Q1=Q0+Q0

```

```

CLCD0550
CLCD0560
CLCD0570
CLCD0580
CLCD0590
CLCD0600
CLCD0610
CLCD0620
CLCD0630
CLCD0640
CLCD0650
CLCD0660
CLCD0670
CLCD0680
CLCD0690
CLCD0700
CLCD0710
CLCD0720
CLCD0730
CLCD0740
CLCD0750
CLCD0760
CLCD0770
CLCD0780
CLCD0790
CLCD0800
CLCD0810
CLCD0820
CLCD0830
CLCD0840
CLCD0850
CLCD0860
CLCD0870
CLCD0880
CLCD0890
CLCD0900
CLCD0910
CLCD0920
CLCD0930
CLCD0940
CLCD0950
CLCD0960
CLCD0970
CLCD0980
CLCD0990
CLCD1000
CLCD1010
CLCD1020
CLCD1030
CLCD1040
CLCD1050
CLCD1060
CLCD1070
CLCD1080

```

```

A=00*S2ALB
02=.81+01*SALB-F2*ZK3
B02A=(AR-SALB*02+01*CALB**2)/(A+A)
COA=CALB*02/A
DISC= SORT(B02A**2+COA)
IF(B02A.GT.0.) GO TO 32
ALIB=DISC-B02A
GO TO 33
32 CONTINUE
ALIB=COA/(B02A+DISC)
33 CONTINUE
CLB = AR * ALIB
ALIMX = CLMX/(AR + AL)
ADVER = (AMG-ALPH14)/(ALPH14-ALB)
ALI = ALIMX*(ALIMX-ALIB)*ADVER
CL = CLMX+(CLMX-CLB)*ADVER
ANG=AMG-ALI
STALL=.TRUE.
20 CL=CL*SG
IF(1.0-LE.XMAC) GO TO 6050
CDZ = CDZ*SMAC
XMACM = AMAX1(XMAC,.35) - CRM
IF(ALPH14.LT.AMG) GO TO 60
DD = XMACM + 1.9*AMG
C5=1.9
IF(DD-GE.0.) GO TO 30
C5=0.
DD=0.
30 CONTINUE
C6=AMG*CD2
C7=C01 + C6
CD=CDZ+AMG*C7+DD
IF(CD.GT.CDMX) GO TO 70
DCD=C5+C6+C7
GO TO 253
70 CONTINUE
CDSX=CDMX
AS1 = CD1 + 1.9
AS2 = CD2 - CDSX + XMACM
IF(CD2
.EQ.0.) GO TO 80
ALFSX = (SORT(.25*AS1*AS1 - AS2*CD2
GO TO 6040
80 CONTINUE
ALFSX = -AS2/AS1
GO TO 6040
60 CONTINUE
CDSX=CDZ+ALPH14*(CD1
+ALPH14*CD2
1 AMAX1(0.,XMACM + 1.9*ALPH14)
IF(CDSX.GT.CDMX) GO TO 70
ALFSX=ALPH14
6040 CONTINUE
IF(IN.LT.3) GO TO 40
C5=AMG-HALFPI
C6=C5*(CDSX-2.0)/(ALFSX-HALFPI)**2

```

```

CLCD1090
CLCD1100
CLCD1110
CLCD1120
CLCD1130
CLCD1140
CLCD1150
CLCD1160
CLCD1170
CLCD1180
CLCD1190
CLCD1200
CLCD1210
CLCD1220
CLCD1230
CLCD1240
CLCD1250
CLCD1260
CLCD1270
CLCD1280
CLCD1290
CLCD1300
CLCD1310
CLCD1320
CLCD1330
CLCD1340
CLCD1350
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CLCD1370
CLCD1380
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CLCD1400
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CLCD1460
CLCD1470
CLCD1480
CLCD1490
CLCD1500
CLCD1510
CLCD1520
CLCD1530
CLCD1540
CLCD1550
CLCD1560
CLCD1570
CLCD1580
CLCD1590
CLCD1600
CLCD1610
CLCD1620

```



```

CD=C5*C6+2.0
DCD=C5+C6
GO TO 254
40 CONTINUE
ZK4=2.1*ZK3
CALF=1./COS(ALFSX)
SALF=CALF*SIN(ALFSX)**2
CALF=CDSX*CALF
CD=ZK4*SAMG**2+(CALF-SALF*ZK4)*CANG
RETURN
6050 CD=CDMX
DCD=0.
IF(SSMM.GT.XMAC) GO TO 253
CD=4.*(AMG**2+YAERO(15,N))*SMAC*CDZ
DCD=8.*AMG*SMAC
6060 IF(CD.LE.CDMX) GO TO 253
CD=CDMX
DCD=0.
253 IF(N.LT.3) RETURN
254 CONTINUE
IF(STALL) WRITE (6,22) (HEAD(J,N-2),J=1,3),ALD,CL,CD
C3=CD
C4=CL
MSGG = -SG
CALL MICE (C3,C4,ALI,CD,CL,MSGG)
RETURN
22 FORMAT (1H0,3A4,'STALLED AT ',F7.3,' DEGREES CL = ',F6.3,' CD = ',
1 F6.3)
6101 FORMAT ('0 EXCESSIVE ANGLE OF ATTACK FOR N = ',I2)
END

```

CLC01630
 CLC01640
 CLC01650
 CLC01660
 CLC01670
 CLC01680
 CLC01690
 CLC01700
 CLC01710
 CLC01720
 CLC01730
 CLC01740
 CLC01750
 CLC01760
 CLC01770
 CLC01780
 CLC01790
 CLC01800
 CLC01810
 CLC01820
 CLC01830
 CLC01840
 CLC01850
 CLC01860
 CLC01870
 CLC01880
 CLC01890
 CLC01900
 CLC01910
 CLC01920

SUBROUTINE COMSOL(COFF,REPRT1,ZPRT1,REPRT2,ZPRT2)

SOLUTION OF SIMULTANEOUS EQUATIONS
WITH COMPLEX COEFFICIENTS
N = ORDER OF MATRIX

COMPLEX A,TEMP,DET,COEF

3 CONTINUE
DET = (1.0,0.0)

COLUMNAR REARRANGEMENT OF MATRIX

AM1=N-1
DO 60 I=1,NM1
JJ=I+1
IMAX=I
AMAXT = REAL(A(JJ,I))**2 + AIMAG(A(JJ,I))**2
DO 29J=JJ,N
ATEST1 = REAL(A(J,I))**2 + AIMAG(A(J,I))**2
ATEST2 = REAL(A(IMAX,I))**2 + AIMAG(A(IMAX,I))**2
IF(ATEST1-ATEST2) 29,29,28
28 IF(ATEST1.LE.AMAXT) GO TO 29
AMAXT = ATEST1
IMAX = J

29 CONTINUE
IF(IMAX-I) 60,60,33
33 DET=-DET
DO 50K=1,NP1
TEMP=A(I,K)
A(I,K)=A(IMAX,K)
A(IMAX,K)=TEMP
50 CONTINUE
60 CONTINUE

AUGMENT INPUT MATRIX WITH THE IDENTITY MATRIX

NP2 = 4
NP1 = 5
DO 10 I=1,N
DO 11 J=NP2,NP1
A(I,J) = 0.0
11 CONTINUE
10 CONTINUE
DO 13 I=1,N
J = I + NP1
A(I,J) = 1.0
13 CONTINUE

COMS0010
COMS0020
COMS0030
COMS0040
COMS0050
COMS0060
COMS0070
COMS0080
COMS0090
COMS0100
COMS0110
COMS0120
COMS0130
COMS0140
COMS0150
COMS0160
COMS0170
COMS0180
COMS0190
COMS0200
COMS0210
COMS0220
COMS0230
COMS0240
COMS0250
COMS0260
COMS0270
COMS0280
COMS0290
COMS0300
COMS0310
COMS0320
COMS0330
COMS0340
COMS0350
COMS0360
COMS0370
COMS0380
COMS0390
COMS0400
COMS0410
COMS0420
COMS0430
COMS0440
COMS0450
COMS0460
COMS0470
COMS0480
COMS0490
COMS0500
COMS0510
COMS0520
COMS0530
COMS0540

```

C C
C SOLUTION
DO 19 I=1,N
  IP1 = I+1
  TTEST = REAL(A(I,I))*2 + AIMAG(A(I,I))*2
  IF (TTEST.LE.0.000001) GO TO 99
  12 DO 15 J = IP1,N2PI
    A(I,J) = A(I,J)/A(I,I)
  15 CONTINUE
    DO 18 K = 1,N
      IF(K-I) 16,18,16
    16 DO 17 J = IP1,N2PI
      A(K,J) = A(K,J) - A(K,I)*A(I,J)
    17 CONTINUE
    18 CONTINUE
    19 CONTINUE
C C C
C DETERMINANT EVALUATION
DO 20 I = 1,N
  DET = DET * A(I,I)
  20 CONTINUE
  ZPRT1 = REAL(A(1,3))
  ZPRT1 = AIMAG(A(1,3))
  ZPRT2 = REAL(A(2,3))
  ZPRT2 = AIMAG(A(2,3))
  RETURN
C C C
C SINGULAR MATRIX
99 PRINT 999,I,I,A(I,I)
999 FORMAT (I/3H A(I,I),I2,1H,,I2,4H) = .2F10.8 )
94 FORMAT(7E12.4)
  RETURN
  END

```

```

COMS0550
COMS0560
COMS0570
COMS0580
COMS0590
COMS0600
COMS0610
COMS0620
COMS0630
COMS0640
COMS0650
COMS0660
COMS0670
COMS0680
COMS0690
COMS0700
COMS0710
COMS0720
COMS0730
COMS0740
COMS0750
COMS0760
COMS0770
COMS0780
COMS0790
COMS0800
COMS0810
COMS0820
COMS0830
COMS0840
COMS0850
COMS0860
COMS0870
COMS0880
COMS0890

```

```

SUBROUTINE CON1 (XCON, O3ELE, TRIND, COLJET, EIMAST, PCGOEO, PCGMAX)
COMMON /STRIMA/ AY, VH, AGH, OT1(2), OT2(2), IXZ,
1 OMR, XXO, YVO, ZZO, ALGF, APFP, AVFP,
2 CGML, COLL(6), CYCF(3), CYCL(3),
3 OIST, KCIT(20), PEDAI(3), OMAX,
4 QMRS, TIME, TMAX, XCIT(20,6), ALGEZ,
5 ALGE1, ALGE2, CGSTA, CPWIC, OIXIZ,
6 OIYIX, OIZIV, OTZMT, OTZML, OTZTI, FTKTS,
7 HUBKM(2,2), HUBKI(2,2),
8 KREAD, PIU30, TSTAB(14), ZMAX2, ZMAX3,
9 ASECOL, CYPWIC, GFARAT, PS0550,
COMMON /MANAL/
1 PSISTP, QXBRK, RUDINO, ZOELT1, ZOELT2
2 Q, AP, PED, QMG, TZM, TIM, T2M,
3 TZT, T1T, T2T, ALFL, CZET, PS00,
4 SZET, TAXL, TAXR, XAWG, KLNK(16), ZAWG,
5 ALCYP, ALFIN, ALLWG, ALRWG, CDELE, COFIN,
6 COLWG, CORWG, CLELE, CLFIN, CLLWG, CLRWG, CHING,
7 CYCR1, CYCR2, CZET4, CZET6, CZET9, RANGE,
8 SZET5, SZET7, SZET8, NGCOL, XAELE, XAFIN,
9 XAFUS, XAJET, YAFIN, ZAELE, ZAFIN, ZAFUS,
10 YAELE, YAFUS, YALWG, YARWG, YALJET, YARJET,
11 ZAJET, ALECR1, ALGFPD, BOTTOM, CZET11,
12 CZET12, CZET13, FIZETA, HALFPI, SZET10,
13 XAPYLO, YGUSTW, ZAPYLO, ZFLWGL, ZFRWGL,
14 TZMS, TIMS, T2MS, TZTS, T1TS, T2TS,
15 C, CLOCK, FLOCK, XLOCK, TCLOCK
16 DIMENSION XCON(63)
17 DATA OTR, OTRR, PO10TR / .1745329E-01, .57.29578, .1745329E-03/
18 SET UP VALUES FOR COLLECTIVE
19 COLL(1)=XCON(1)
20 IF(COLL(1).EQ.0.) COLL(1)=100.
21 COLL(2)=XCON(2)*OTR
22 COLL(3)=XCON(3)
23 COLL(4)=XCON(4)*OTRR
24 COLL(5) = XCON(5)
25 IF(COLL(5).EQ.0.) COLL(5) = 100.
26 XXX = XCON(6)
27 IF(XXX.EQ.0.) XXX=COLL(5)
28 SLOPE OF RANGE
29 COLL(6)=(XXX-COLL(5))/HALFPI
30 CLOCK=XCON(7)
31 TZMS=XCON(8)*OTR
32 CPWIC=XCON(10)*COLL(1)*PO10TR
33 O3ELE=XCON(11)*COLL(1)*PO10TR
34 COLJET=XCON(12)*COLL(1)/100.
35 SET UP VALUES FOR F/A CYCLIC
36 CYCF(1)=XCON(15)
37 IF(CYCF(1).EQ.0.) CYCF(1)=100.

```

```

CON10010
CON10020
CON10030
CON10040
CON10050
CON10060
CON10070
CON10080
CON10090
CON10100
CON10110
CON10120
CON10130
CON10140
CON10150
CON10160
CON10170
CON10180
CON10190
CON10200
CON10210
CON10220
CON10230
CON10240
CON10250
CON10260
CON10270
CON10280
CON10290
CON10300
CON10310
CON10320
CON10330
CON10340
CON10350
CON10360
CON10370
CON10380
CON10390
CON10400
CON10410
CON10420
CON10430
CON10440
CON10450
CON10460
CON10470
CON10480
CON10490
CON10500
CON10510
CON10520
CON10530
CON10540

```

```

CYCF(2)=XCON(16)*DTR
IF(CYCF(2).EQ.0.) CYCF(2)=-.872666
CYCF(3)=XCON(17)*P01DTR
IF(CYCF(3).EQ.0.) CYCF(3)=DTR
FLOCK=XCON(18)
TIMS=XCON(19)*DTR
T1TS=TIMS*TRIND
RDPIN=CYCF(1)/(100.*CYCF(3))
ALGE1=XCON(27)*RDPIN*DTR
ALGE2=XCON(28)*RDPIN**2*DTR

SET UP VALUES FOR LATERAL CYCLIC
CYCL(1)=XCON(29)
IF(CYCL(1).EQ.0.) CYCL(1)=100.
CYCL(2)=XCON(30)*DTR
IF(CYCL(2).EQ.0.) CYCL(2)=-.872666
CYCL(3)=XCON(31)*P01DTR
IF(CYCL(3).EQ.0.) CYCL(3)=DTR
XLOCK=XCON(32)
T2MS=XCON(33)*DTR
T2TS=T2MS*TRIND
CYPWIC=XCON(41)*CYCL(1)/(100.*CYCL(3))*DTR

SET UP VALUES FOR PEDAL
PEOA(1)=XCON(43)
IF(PEOA(1).EQ.0.) PEOA(1)=100.
PEOA(2)=XCON(44)*DTR
IF(PEOA(2).EQ.0.) PEOA(2)=-.872666
PEOA(3)=XCON(45)*P01DTR
IF(PEOA(3).EQ.0.) PEOA(3)=DTR
TCLOCK=XCON(46)
T2TS=XCON(47)*DTR

MISC. VALUES
PCGMAX=XCON(13)*DTR
PCGDEO=XCON(14)
RUOIND=XCON(48)
FIMAST=XCON(63)
RETURN
END

```

C C C

C C C

C C C

```

CON10550
CON10560
CON10570
CON10580
CON10590
CON10600
CON10610
CON10620
CON10630
CON10640
CON10650
CON10660
CON10670
CON10680
CON10690
CON10700
CON10710
CON10720
CON10730
CON10740
CON10750
CON10760
CON10770
CON10780
CON10790
CON10800
CON10810
CON10820
CON10830
CON10840
CON10850
CON10860
CON10870
CON10880
CON10890
CON10900
CON10910
CON10920
CON10930
CON10940
CON10950
CON10960
CON10970

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```

SUBROUTINE CON2 (XCON,XLNK,KONFIG,PUDIND)
DATA DTR/ .1745329E-01/
DIMENSION XCON(63),XLNK(16)
XLNK(12)=XCON(25)
XLNK(13)=XCON(26)
IF(KONFIG.NE.1) GO TO 10
XLNK(2)=1.
IF(PUDIND.EQ.0.) GO TO 11
PUDIND=1.
XLNK(2)=XCON(58)
11 DD=PTR*PUDIND
XLNK(1)=XCON(57)*DD
XLNK(3)=XCON(59)*DD*DTR
RETURN
10 XLNK(1)=XCON(24)
XLNK(2)=XCON(40)
XLNK(3)=XCON(9)
DO 13 I=1,3
IF(XLNK(I).EQ.0.) XLNK(I)=1.
13 CONTINUE
IF(KONFIG.EQ.3) GO TO 12
XLNK(4)=XCON(23)
XLNK(5)=XCON(22)
XLNK(6)=XCON(55)
XLNK(7)=XCON(54)
RETURN
12 XLNK(4)=XCON(37)
XLNK(5)=XCON(51)
XLNK(6)=XCON(36)
XLNK(7)=XCON(50)
XLNK(8)=XCON(39)
XLNK(9)=XCON(53)
XLNK(10)=XCON(38)
XLNK(11)=XCON(52)
XLNK(14)=XCON(60)
XLNK(15)=XCON(61)
XLNK(16)=XCON(52)*DTR
RETURN
END

```

```

CON20010
CON20020
CON20030
CON20040
CON20050
CON20060
CON20070
CON20080
CON20090
CON20100
CON20110
CON20120
CON20130
CON20140
CON20150
CON20160
CON20170
CON20180
CON20190
CON20200
CON20210
CON20220
CON20230
CON20240
CON20250
CON20260
CON20270
CON20280
CON20290
CON20300
CON20310
CON20320
CON20330
CON20340
CON20350
CON20360
CON20370
CON20380
CON20390

```

```

SUBROUTINE CURVET
COMMON /TOPLOT/ AH(3),AL(3),EXIT,ICOM(49),IPSN,
1 NPART,NVARA,NVARB,NVARC,NSCALE
1 NVAR,NPRINT,NTIME
COMMON /PLOTD/ HEAD(9,267)
DIMENSION A(266),NC(266),AMP(266),PHI(266),C(266),SUM1(266),
1 S1(266),SUM3(266),SUM4(266),CDEF(266),NUMC(266)
REAL*8 X,Y,R,S1,S2,S3,S4,S5,SUM1,SUM2,SUM3,SUM4,
1 DIFF1,DIFF2,DIFF3,DIFF5,DIFF6,DENOM,CON1,CON2,CON3,DIFF7
CALL TIMEX (TUSED,TDELT,TLEFT)
DTR=.174532925E-01
DTRR=57.2957795
TWOP1=6.283185307
C INITIALIZE VARIABLE SUMS
DO 10 I=1,254
NC(I)=0
SUM1(I)=0.
SUM2(I)=0.
SUM3(I)=0.
SUM4(I)=0.
10 CONTINUE
C READ CODES FOR VARIABLES TO BE FIT
READ (5,900) (NC(I),I=1,NVARA)
C SKIP TRANSIENT POINTS
DO 11 I=1,NVARC
READ (3) JPSN,T,A
11 CONTINUE
TSTART=T
C CHANGE INPUT CPS TO RAD/SEC AND INITIALIZE TIME SUMS
OMEGA=AL(1)*TWOP1
S1=0.
S2=0.
S3=0.
S4=0.
S5=0.
KOUNT=0
998 READ (3,END=999) JPSN,T,A
IF (T.GT.9.E+07) GO TO 999
X=SIN(OT)
Y=COS(OT)
C COMPUTE SUMS WHICH ARE CONSTANT WRT VARIABLES AND COUNT POINTS
S1=S1+X
S2=S2+Y
S3=S3+X*X
S4=S4+Y*Y
S5=S5+X*Y
KOUNT=KOUNT+1
C COMPUTE SUMS DEPENDENT UPON EACH VARIABLE
DO 12 J=1,NVARA
I=NC(J)
R=A(I)
SUM1(I)=SUM1(I)+R
SUM2(I)=SUM2(I)+R*X
CURV0010
CURV0020
CURV0030
CURV0040
CURV0050
CURV0060
CURV0070
CURV0080
CURV0090
CURV0100
CURV0110
CURV0120
CURV0130
CURV0140
CURV0150
CURV0160
CURV0170
CURV0180
CURV0190
CURV0200
CURV0210
CURV0220
CURV0230
CURV0240
CURV0250
CURV0260
CURV0270
CURV0280
CURV0290
CURV0300
CURV0310
CURV0320
CURV0330
CURV0340
CURV0350
CURV0360
CURV0370
CURV0380
CURV0390
CURV0400
CURV0410
CURV0420
CURV0430
CURV0440
CURV0450
CURV0460
CURV0470
CURV0480
CURV0490
CURV0500
CURV0510
CURV0520
CURV0530
CURV0540

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```

SUM3(I)=SUM3(I)+B*Y
SUM4(I)=SUM4(I)+B*B
12 CONTINUE
GO TO 998
C      COMPUTE INTERMEDIATE VARIABLES
999 DIFF1=KDUNT*S3-S1**2
DIFF2=KDUNT*S4-S2**2
DIFF3=KDUNT*S5-S1*S2
DENOM=DIFF1*DIFF2-DIFF3**2
CALL WROT
WRITE (6,9D1) TSTART,AL(1)
C      COMPUTE AMPLITUDE, PHASE ANGLE, CONSTANT, AND RESIDUE
DO 13 J=1,NVARA
I=NC(J)
DIFF5=KDUNT*SUM2(I)-S1*SUM1(I)
DIFF6=KDUNT*SUM3(I)-S2*SUM1(I)
CON1=(DIFF5*DIFF2-DIFF6*DIFF3)/DENOM
CON2=(DIFF1*DIFF6-DIFF5*DIFF3)/DENOM
AMP(I)=DSORT(CON1**2+CON2**2)
PHI(I)=ATAN2(CON2,CON1)*DTR
CON3=(SUM1(I)-CON1*S1-CON2*S2)/KOUNT
DIFF7 =CON1*(CON1*S3-2.*SUM2(I)+2.*CON2*S5+2.*CON3*S1)
1   +CON2*(CON2*S4-2.*SUM3(I)+2.*CON3*S2)
2   +CON3*(KDUNT*CON3-2.*SUM1(I))+SJM4(I)
C(I)=CON3
CDEF(I)=DSORT(1.-DIFF7/(SUM4(I)-SUM1(I)**2/KOUNT))
WRITE (6,9D2) (HEAD(K,I),K=1,9),AMP(I),PHI(I),C(I),CDEF(I)
13 CONTINUE
IF(NVARB.EQ.0) GO TO 18
CALL WROT
WRITE (6,9D3)
C      AMPLITUDE AND PHASE ANGLE COMPARISONS
DO 100 I=1,NVARB
READ (5,9D0) NNUM,ND, (NUMC(J),J=1,NNUM)
Q1=1./AMP(ND)
Q2=PHI(ND)
DO 15 K=1,NNUM
J=NUMC(K)
RATIO=AMP(J)*Q1
DIFF=PHI(J)-Q2
WRITE (6,9D4) (HEAD(L,J),L=1,9), (HEAD(L,ND),L=1,9),RATIO,DIFF
15 CONTINUE
100 CONTINUE
16 KLIN=AL(2)+.1
IF(KLIN.EQ.0) GO TO 101
CALL WROT
WRITE (6,9D8)
DO 16 J=1,KLIN
READ (5,9D0) NDEP,NIN1,NIN2
SIN2=SIN(PHI(NIN1)-PHI(NIN2))*DTR
IF(ABS(SIN2).LT..0001) GO TO 17
SIN1=SIN(PHI(NIN1)-PHI(NDEP))*DTR
SIN3=SIN(PHI(NDEP)-PHI(NIN2))*DTR
XK1=AMP(NDEP)/SIN2
CURVC550
CURV0560
CURV0570
CURV0580
CURV0590
CURV0600
CURV0610
CURV0620
CURV0630
CURV0640
CURV0650
CURV0660
CURV0670
CURV0680
CURV0690
CURV0700
CURV0710
CURV0720
CURV0730
CURV0740
CURV0750
CURV0760
CURV0770
CURV0780
CURV0790
CURV0800
CURV0810
CURV0820
CURV0830
CURV0840
CURV0850
CURV0860
CURV0870
CURV0880
CURV0890
CURV0900
CURV0910
CURV0920
CURV0930
CURV0940
CURV0950
CURV0960
CURV0970
CURV0980
CURV0990
CURV1000
CURV1010
CURV1020
CURV1030
CURV1040
CURV1050
CURV1060
CURV1070
CURV1080

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CURV1090
CURV1100
CURV1110
CURV1120
CURV1130
CURV1140
CURV1150
CURV1160
CURV1170
CURV1180
CURV1190
CURV1200
CURV1210
CURV1220
CURV1230
CURV1240
CURV1250
CURV1260
CURV1270
CURV1280
CURV1290
CURV1300
CURV1310
CURV1320
CURV1330
CURV1340
CURV1350
CURV1360
CURV1370
CURV1380
CURV1390
CURV1400
CURV1410
CURV1420
CURV1430
CURV1440
CURV1450
CURV1460

XK2=XK1*SIN3
XK3=XK1*SIN1
BK=XK2/AMP(NIN1)
CK=XK3/AMP(NIN2)
DK=C(NDEP)-BK*C(NIN1)-CK*C(NIN2)
WRITE (6,906) (HEAD(K,NDEP),K=1,9),(HEAD(K,NIN1),K=1,9),BK,
1      (HEAD(K,NIN2),K=1,9),CK,DK
GO TO 16
17 WRITE (6,907) (HEAD(K,NIN1),K=1,9),(HEAD(K,NIN2),K=1,9)
16 CONTINUE
101 CALL TIMEX (TUSED,TDELT,TLEFT)
WRITE (6,905) TDELT,TUSED
RETURN
900 FORMAT (1415)
901 FORMAT (1H0//1H ,32X,'LEAST SQUARES CURVE FIT STARTING AFTER',
1      F7.3,' SECONDS MANEUVER TIME'//1H ,23X,
2      'FIT) = AMPLITUDE*SIN(OMEGA*T + PHASE ANGLE) + CONSTANT'
3      10X,'WITH OMEGA =',F7.3,' CPS'//
4      1H ,20X,'VARIABLE',23X,'AMPLITUDE',6X,
5      'PHASE ANGLE (DEGREES)',7X,'CONSTANT',11X,'COEF OF CORR')
902 FORMAT (1H0,6X,9A4,46X,G15.5)
903 FORMAT (1H0//1H ,48X,'AMPLITUDE AND PHASE ANGLE COMPARISONS'//
1      1H ,39X,'VARIABLES',39X,'AMPLITUDE RATIO',3X,
2      'PHASE ANGLE DIFFERENCE')
904 FORMAT (1H0,7X,9A4,77,9A4,217X,G15.5)
905 FORMAT (1H0,10X,F10.3,' MINUTES USED IN CURVE FITTING',
1      F10.3,' MINUTES TOTAL COMPUTING TIME')
906 FORMAT (1H0,30X,'A',10X,9A4/
1      1H ,30X,'B',10X,9A4,10X,G15.5/
2      1H ,30X,'C',10X,9A4,10X,G15.5/
3      1H ,69X,'CONSTANT',10X,G15.5)
907 FORMAT (1H0,10X,'THE PHASE ANGLE DIFFERENCE BETWEEN ',9A4,' AND ',CURV1400
1      9A4//1H ,10X,' IS A MULTIPLE OF 180 DEGREES. THEREFORE, NO VCURV1410
2      VARIABLE CAN BE EXPRESSED AS A LINEAR FUNCTION OF THEM.')
908 FORMAT (1H0//1H ,35X,'VARIABLE ',A,' AS A LINEAR COMBINATION OF VCURV1430
1      IRIABLES ',B,' AND ',C,'//1H ,56X,'A = KA*B + KC*C + KD//1H ,
2      27X,'VARIABLE',22X,'NAME',28X,'COEFFICIENT')
END

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```

C81L0010
C81L0020
C81L0030
C81L0040
C81L0050
C81L0060
C81L0070
C81L0080
C81L0090
C81L0100
C81L0110
C81L0120
C81L0130
C81L0140
C81L0150
C81L0160
C81L0170
C81L0180
C81L0190
C81L0200
C81L0210
C81L0220
C81L0230
C81L0240
C81L0250
C81L0260
C81L0270
C81L0280
C81L0290
C81L0300
C81L0310
C81L0320
C81L0330
C81L0340
C81L0350
C81L0360
C81L0370
C81L0380
C81L0390
C81L0400
C81L0410
C81L0420
C81L0430
C81L0440
C81L0450
C81L0460
C81L0470
C81L0480
C81L0490
C81L0500
C81L0510
C81L0520
C81L0530
C81L0540

SUBROUTINE CALL
  LIBRARY UPDATING
  *****
  COMMON /TOPLOT/ AH(3),AL(3),EXIT,ICOM(49),IPSN,
1    NPART,NVARA,NVARB,NVARC,NSCALE
1    ,NVAR5,NPRINT,NTIME
  DIMENSION A(266)

  READ DATA CARD IN C81-11 DRIVER...
  NPART = 8      (TO GET IN HERE)
  NSCALE =      (TO SPECIFY WHICH LIBRARY PATH)

  NPATH = 0      TO DUMP TIME HISTORY DATA ON TAPE 9
    READ SINGLE TIME-HISTORY FROM (3),
    WRITE TIME HISTORY ON 9
    NPATH = 1 IS FOR LAST JOB THIS TERMINATES TAPE 9

  NPATH = 2      IS FOR PULLING DATA FROM 9 AND WRITING IT ON 3

  TO PULL A SPECIFIC IPSN FOR RE-PLOTTING (NPATH=2),
  USE COMMENT CARDS WHICH WERE ON DECK WHEN T-H WAS MADE
  ***** DO NOT CHANGE IPSN ON FIRST COMMENT CARD *****
  *****

  CALL TIMEK (TUSED,TOELT,TLEFT)
  NPATH = NSCALE
  NPSN=0
  WRITE(6,202)
  IF(NPATH.LT.0.OR.NPATH.GT.2) GO TO 130
  IF(NPATH.EQ.2) GO TO 100
    TRANSFER T-H FROM 3 TO 9
  203 READ (3) JPSN,T,A
  25 WRITE(9,21) JPSN,T,A
  IF(T.LT.9999.E+04) GO TO 203
  WRITE(6,204) JPSN
  IF(NPATH.EQ.0) GO TO 207
  T=889888.E+01
  WRITE (9,21) IPSN,T,A
  ENDFILE 9
  207 REWIND 9
  GO TO 600
  100 READ (5,1011) IPSN,ICOM
    SEARCH OLD MASTER FOR T-H TO PLOT
  110 READ (8,21) JPSN,T,A
  IF(888.E+04.LT.T.AND.T.LT.9999.E+04) GO TO 140
  IF(NPSN.EQ.JPSN) GO TO 115
  NPSN=JPSN
  WRITE (6,205) NPSN
  115 IF(IPSN.NE.JPSN) GO TO 110
    WRITE T-H ON TAPE 3
  120 WRITE (3) JPSN,T,A

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IF(1.LT.9999.E+04) GO TO 110
WRITE (6,206) MPSN
ENDFILE 3
REWIND 8
GO TO 600
140 WRITE(6,14)
GO TO 600
130 WRITE(6,13)
500 CALL TIMEX (TUSED,TDELT,TLEFT)
WRITE(6,601) TDELT
RETURN
13 FORMAT (' NSCALE HAS ILLEGAL VALUE')
14 FORMAT(30H IPSN INDICATED NOT ON LIBRARY )
21 FORMAT (19,2E12.5/(10E12.5))
202 FORMAT (1H1,18X,12HPROGRAM C01L/14X,20HTIME HISTORY LIBRARY //
1      48H ON PULLED FROM PUT ON
2      48H LIBRARY TAPE LIBRARY TAPE SCRATCH TAPE )
204 FORMAT(34X,112)
205 FORMAT(114)
206 FORMAT (18X,112)
601 FORMAT(1H /24H TIME USED WITHIN C01L =, F5.2.5H MIN.)
1011 FORMAT (2X,18,15A4/17A4/17A4)
END
C01L0550
C01L0560
C01L0570
C01L0580
C01L0590
C01L0600
C01L0610
C01L0620
C01L0630
C01L0640
C01L0650
C01L0660
C01L0670
C01L0680
C01L0690
C01L0700
C01L0710
C01L0720
C01L0730
C01L0740
C01L0750
C01L0760
C01L0770

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DAMP0010
DAMP0020
DAMP0030
DAMP0040
DAMP0050
DAMP0060
DAMP0070
DAMP0080
DAMP0090
DAMP0100
DAMP0110
DAMP0120
DAMP0130
DAMP0140
DAMP0150
DAMP0160
DAMP0170
DAMP0180
DAMP0190
DAMP0200
DAMP0210
DAMP0220
DAMP0230
DAMP0240
DAMP0250

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SUBROUTINE DAMPER
COMMON /STRIAB/ D(21),DT(21),E(79),F(10),X(10),
1 DL,DM,DN,DX,DY,DZ,IX,IY,IZ,PD(10,11),
2 DTR,EPD,ERR(10),KMI,RMD,
3 R12,SPD(6,6,3),XBM(21),XEL(14),
4 XER(7),XFC(28),XFN(7),XFS(35),
5 XGM(7),XIT(21),XMR(49),XTR(49),
6 XWG(21),YMR(21),YTR(21),YWG(21),
7 YEL(21),YFN(21),BLCG,DAMP,DEPD(10),
8 EPDS,EPDX(10),MASS,QSV1,TMRS,TTRS,
9 WLCG,XCOM(63),XJET(14),XMIN,AYEFP,
A BETAES(2),CMPCD,DHADOQ,DYBDR,GUESS,
B NPASS,POPHI(10,11),STACG,TZERO,
C XMAST,DHADAQ,DQDCOL,DTRRSQ,DYBDBR,
D ENGRPH,MXPASS,PSD30P,TRIND1,XLIMIT
XLIMIT=.5*XLIMIT
IF(XLIMIT.LT.XMIN) XLIMIT=XMIN
EPD=.5*XLIMIT
IF(EPD.LT..1745329E-03) EPD=.1745329E-03
DO 2 I=1,9
DEPD(I)=EPD*EPDX(I)
2 CONTINUE
DEPD(10)=-EPD
RETURN
END

```

[illegible]

155

2 TOTAL LAT CYCLIC, DEG ROTOR2 LOWER FLAPPING LIMIT, DEG ROATO1090
 3 ROT2 LAT HUBSPRING, FT-LB/DEG // OATO1100
 DATA PLOT / OATO1110
 A X-COMP VELOCITY, FIXED AXES, FT/SEC Y-COMP VELOCITY, FIXED AXES, FT/SEC TOTAL DISTANCE FLOWN, OATO1120
 B, FT/SEC Z-COMP VELOCITY, FIXED AXES, FT/SEC // OATO1130
 C FT AIR SPEED, KTS // OATO1140
 DATA PLOT / // X-COMP DISP., FT OATO1150
 1 XEO AXES, FT Y-COMP DISP., FT OATO1160
 2 SP., FIXED AXES, FT ALTITUDE, FT GROATO1170
 3 WIND SPEED, KTS // OATO1180
 DATA PLOT / // CLIMB ANGLE, DEG OATO1190
 4 U-DOT ACCEL., BODY AXES, FT/SEC V-DOT ACCEL., BODY AXES, FT/SEC OATO1200
 5 /SEC W-DOT ACCEL., BODY AXES, FT/SEC P-DOT ACCEL., BODY AXES, FT/SEC OATO1210
 6 S, DEG/SEC Q-DOT ACCEL., BODY AXES, DEG/SEC // OATO1220
 DATA PLOT / // R-DOT ACCEL., BODY AXES, FT/SEC OATO1230
 7 DY AXES, DEG/SEC COLLEC. BODY WT., ACCEL., DEG/SEC U VELOCITY, FT/SEC OATO1240
 8 Y, BODY AXES, FT/SEC V VELOCITY, BODY AXES, FT/SEC OATO1250
 9 VELOCITY, BODY AXES, FT/SEC P VELOCITY, BODY AXES, DEG/SEC OATO1260
 A // OATO1270
 DATA PLOT / OATO1280
 A O VELOCITY, BODY AXES, DEG/SEC R VELOCITY, BODY AXES, DEG/SEC OATO1290
 B SEC COLLEC. BODY WT., VELOCITY, DEG/SEC YAM VELOCITY, FIXED/8 OATO1300
 CODY, DEG/SEC PITCH VELOCITY, FIXED/8ODY, DEG/SEC // OATO1310
 OATA PLOT / // ROLL VELOCITY, FIXED/8ODY, DEG/SEC YAM ANGLE, FIXED OATO1320
 10 /8ODY, DEG PITCH ANGLE, FIXED/8ODY, DEG ROLL ANGLE OATO1330
 25, FIXED/8ODY, DEG COLLECTIVE STICK POSITION, PCT F/ADATO1340
 3 CYCLIC STICK POSITION, PCT // OATO1350
 DATA PLOT / // LEFT WING ANGLE OF ATTACK, DEG OATO1360
 4 RIGHT WING ANGLE OF ATTACK, DEG ELEVATOR ANGLE OF ATTACK, DDATO1370
 5 EG FIN ANGLE OF ATTACK, DEG BODY YAM WRT. FLIGHT OATO1380
 6 PATH, DEG C.G. STATION LINE LOCATION, IN. // OATO1390
 DATA PLOT / // X-COMP GUST VEL, OATO1400
 7, BODY AXES, FT/SEC X-COMP G-S, BODY AXES LATERAL CDATO1410
 8 CYCLIC STICK POSITION, PCT LEFT WING COEFFICIENT OF LIFT RIGDATO1420
 9 HT WING COEFFICIENT OF LIFT ELEVATOR COEFFICIENT OF LIFT OATO1430
 A // OATO1440
 DATA PLOT / OATO1450
 A FIN COEFFICIENT OF LIFT BODY PITCH WRT. FLIGHT PATHOATO1460
 B, DEG C.G. BUTT LINE LOCATION, IN. Y-COMP GUST VEL., 800 OATO1470
 CY AXES, FT/SEC Y-COMP G-S, BODY AXES // OATO1480
 DATA PLOT / // LEFT WING COEFF OATO1490
 1 TICIENT OF DRAG RIGHT WING COEFFICIENT OF DRAG ELEVATOR OATO1500
 2 COEFFICIENT OF DRAG FIN COEFFICIENT OF DRAG C-GOATO1510
 3, WATER LINE LOCATION, IN. Z-COMP GUST VEL., BODY AXES, FT/SOATO1520
 4 EC // OATO1530
 DATA PLOT / // Z-COMP G-S, BODY AXES OATO1540
 4 RIGHT/CENTER JET THRUST, LB ENGINE TORQUE SUPPLIED, FT-DATO1550
 5 LB TOTAL HORSEPOWER REQUIRED LEFT JET THRUST, LB OATO1560
 6 SHAFT HORSEPOWER ROTOR BRAKE TOROATO1570
 7 OUE APPLIED, FT-LB // OATO1580
 DATA PLOT / // AZIMUTH LOC., BLADE1, ROTOR1, DEG AZIMUTH LOC., OATO1590
 1 BLADE2, ROTOR1, DEG AZIMUTH LOC., BLADE3, ROTOR1, DEG AZIMUTH OATO1600
 2 LOC., BLADE4, ROTOR1, DEG AZIMUTH LOC., BLADE5, ROTOR1, DEG AZIMUTH OATO1610
 3 AZIMUTH LOC., BLADE6, ROTOR1, DEG AZIMUTH LOC., BLADE7, ROTOR1, DEDATO1620

7FT WING, LB Z-FORCE FROM ELEVATOR, LB Z-FORCE FDATE02170
 8FROM FUSELAGE, LB Z-FORCE FROM RIGHT JET, LB Z-FDATE02180
 9ORCE FROM LEFT/CENTER JET, LB Z-FORCE FROM ROTOR1, LB Z-FDATE02190
 A // DAT02200
 DATA PLOTS /
 A Z-FORCE FROM ROTOR2, LB Z-FORCE FROM WEAPON FIRE, LDATE02210
 B Z-FORCE FROM WEIGHT, LB TOTAL ROLL MOM ON C.GDATE02220
 C FT-LB ROLL MOM FROM RIGHT WING, LB ROLL MOM FROM EDAT02230
 DATA PLOT1 / ROLL MOM FROM LEFT WING, FT-LB ROLL MOM FROM EDAT02240
 1ELEVATOR, FT-LB ROLL MOM FROM FUSELAGE, FT-LB ROLL MOM FROM EDAT02250
 2FROM RIGHT JET, FT-LB ROLL MOM FROM LEFT/CENTR JET, FT-LB ROLL MOM FROM EDAT02260
 3L MOM FROM ROTOR1 FORCES, FT-LB // ROLL MOM FROM ROTOR2 FORCES, FT-LB ROLL MOM FROM EDAT02270
 DATA PLOT2 / ROLL MOM FROM ROTOR2 FORCES, FT-LB ROLL MOM FROM EDAT02280
 4R ROLL MOM FROM WEAPON FIRE, FT-LB ROLL MOM FROM FIN, FT-LB ROLL MOM FROM EDAT02290
 5 ROLL MOM FROM ROTOR1 TORQUE, FT-LB ROLL MOM FROM ROTOR2, DAT02300
 6TORQUE, FT-LB TOTAL PITCH MOM ON C.G., FT-LB // ROLL MOM FROM ROTOR2, DAT02310
 DATA PLOT3 / PITCH MOM FROM ROTOR2, DAT02320
 7RIGHT WING, FT-LB PITCH MOM FROM LEFT WING, FT-LB PITCH MOM FROM ROTOR2, DAT02330
 8 FROM ELEVATOR, FT-LB PITCH MOM FROM FUSELAGE, FT-LB PITCH MOM FROM ROTOR2, DAT02340
 9CH MOM FROM RIGHT JET, FT-LB PITCH MOM FROM LEFT/CENT JET, FT-LB PITCH MOM FROM ROTOR2, DAT02350
 ALB // PITCH MOM FROM LEFT/CENT JET, FT-LB PITCH MOM FROM ROTOR2, DAT02360
 DATA PLOT4 / PITCH MOM FROM ROTOR2, DAT02370
 A PITCH MOM FROM ROTOR1 FORCES, FT-LB PITCH MOM FROM ROTOR2 FORCEDAT02380
 BS, FT-LB PITCH MOM FROM WEAPON FIRE, FT-LB PITCH MOM FROM FIN, FDATE02390
 CT-LB PITCH MOM FROM ROTOR1 TORQUE, FT-LB // PITCH MOM FROM FIN, FDATE02400
 DATA PLOT5 / PITCH MOM FROM ROTOR2 TORQUE, FT-LB // PITCH MOM FROM FIN, FDATE02410
 IN C.G., FT-LB PITCH MOM FROM RIGHT WING, FT-LB YAW MOM FROM EDAT02420
 2FROM LEFT WING, FT-LB YAW MOM FROM ELEVATOR, FT-LB YAW MOM FROM EDAT02430
 3 MOM FROM FUSELAGE, FT-LB // YAW MOM FROM ELEVATOR, FT-LB YAW MOM FROM EDAT02440
 DATA PLOT6 / YAW MOM FROM RIGHT JET, FT-LB YAW MOM FROM EDAT02450
 4 YAW MOM FROM LEFT/CENT JET, FT-LB YAW MOM FROM ROTOR1 FORCES, DAT02460
 5 FT-LB YAW MOM FROM ROTOR2 FORCES, FT-LB YAW MOM FROM WEAPON FDATE02470
 6IRE, FT-LB YAW MOM FROM FIN, FT-LB // YAW MOM FROM WEAPON FDATE02480
 DATA PLOT7 / YAW MOM FROM ROTOR2 TORQUE, FT-LB YAW MOM FROM ROTOR2, DAT02490
 7TOR1 TORQUE, FT-LB YAW MOM FROM ROTOR2 TORQUE, FT-LB ROTOR1 F/DATE02500
 8A FLAPPING MOMENT, FT-LB ROTOR1 LAT FLAPPING MOMENT, FT-LB ROTOR1 F/DATE02510
 9OR2 F/A FLAPPING MOMENT, FT-LB ROTOR2 LAT FLAPPING MOMENT, FT-LB ROTOR1 F/DATE02520
 A // ROTOR2 LAT FLAPPING MOMENT, FT-LB ROTOR2 LAT FLAPPING MOMENT, FT-LB ROTOR1 F/DATE02530
 DATA PLOT8 / ROTOR2 LAT FLAPPING MOMENT, FT-LB ROTOR2 LAT FLAPPING MOMENT, FT-LB ROTOR1 F/DATE02540
 A NOT USED
 END

BLOCK DATA
 COMMON/LOISK/LOCATE(120)
 COMMON/KVARTR/ KVAR(10)
 COMMON /TAB/ CY41(110),CY42(99),CX41(149),CX42(120),CX43(120),
 CX44(120),CX45(120),CX46(120),CX47(108)
 *K(11),L(17)
 DATA LOCATE/119,116,113,110,107,103,96,89,82,75,120,117,114,111,
 108,104,97,90,83,75,105,100,98,93,91,86,84,79,77,72,
 70,69,68,67,66,65,64,63,62,61,20,22,27,29,34,36,41,
 43,48,50,3,6,9,12,15,19,26,33,40,47,2,5,8,11,14,18,
 25,32,39,46,1,4,7,10,13,17,24,31,38,45,16,21,23,28,
 30,35,37,42,44,49,51,52,53,54,55,56,57,58,59,60,
 101,94,94,92,97,85,80,78,73,71,118,115,112,109,106,
 102,95,88,81,74/
 DATA KVAR/1,2,3,4,5,6,7,8,9,10,11/
 LIFT TABLE (COMPOSITE) AIRFOIL = 64A210 JUNE 9,1967
 DATA CY41/
 1 0.2,0.4,0.6,0.8,1.0,1.1,1.2,1.3,1.4,1.5,1.6,
 2 21.39,49.129,147.161,172.5,180.,
 3 90.,
 4 .228, .25, .27, .285, .308,
 5 .325, 2*.395, .472, .518, .555, .575,
 6 .390, .455, 2*.575, .653, .75, .765,
 7 .585, .653, 2*.650, .872, 2*.9, .833, .805,
 8 .560, .720, .750, .760, 1.095, 1.082, 1.015, .885, .835,
 9 .720, .750, .760, 1.095, 1.17, 1.062, .912, .845,
 10 .792, 2*.722, 1.195, 1.245, 1.253, 1.1, .935, .850,
 11 1.05, .810, 2*.738, 1.24, 1.285, 1.112, .945, .840,
 12 1.155, .920, 2*.740, 1.24, 1.285, 1.112, .945, .840,
 13 .918, 2*.738
 DATA CY42/ 1.295,1.186,1.222,1.08, .955, .832,
 1 .809, 2*.725,
 2 1.19, 1.087, 1.14, 1.038, .955, .82,
 3 .79, 2*.713, .977, 1.06, .991, .955, .80,
 4 1.012, .977, 2*.698, 3*.85, .71,
 5 .77, .8, .83, 2*.64,
 6 .68, 18*1.18,
 7 18*-1.1,
 8 9*-62,
 9 9*-78,
 10 9*0.
 DPAG TABLE (COMPOSITE) AIRFOIL = 64A210 JUNE 9,1967
 DATA CX41/
 1 0.2,0.4,0.6,0.8,1.0,1.1,1.2,1.3,1.4,1.5,1.6,
 2 -180.,-175.,-170.,-165.,-160.,-140.,-120.,-110.,-100.,
 3 -90.,-80.,-70.,-60.,-50.,-30.,-21.,-16.,-15.,
 4 -14.,-13.,-12.,-11.,-10.,-9.,-8.,-7.,-6.,-5.,

I	.01113	.01126	.01132	.01138	.02525	.0595	DATA CX44/	011090
J	.162	.146	.149	.173	.18	.206		DATA CX44/
1	.151	.133	.136	.161	.169	.196		DATA CX44/
2	4*.01025				.01475	.0252		DATA CX44/
3	.13	.108	.123	.143	.157	.187		DATA CX44/
4	4*.01				.012	.0175		DATA CX44/
5	.109	.079	.09	.124	.146	.177		DATA CX44/
6	4*.01				.0102	.013		DATA CX44/
7	.081	.0495	.05625	.08	.135	.1675		DATA CX44/
8	4*.01	.022	.025	.04	.009	.0105		DATA CX44/
9	.053				.123	.158		DATA CX44/
A	4*.01	.011	.01425	.024	.00825	.009		DATA CX44/
B	.031				.055	.148		DATA CX44/
C	4*.01	.00825	.01325	.02325	.008	.00825		DATA CX44/
D	.01				.0435	.1375		DATA CX44/
E	4*.01				2*.008			DATA CX44/
F	2*.009		.02175	2*.046		.107		DATA CX44/
G	4*.01	.009	.062	.085	2*.008			DATA CX44/
H	.0085				.086	.1		DATA CX44/
I	4*.01	.012	.0955	2*.117	2*.008			DATA CX44/
J	.01	.028	.1235	2*.146	.008	.0082		DATA CX44/
1	.016	.028	.1235	2*.146	.00825	.009		DATA CX44/
2	4*.01025	.05	.139	2*.162	.009	.144		DATA CX44/
3	.033	.088	.153	2*.177	.0105	.0105		DATA CX44/
4	4*.0105	.01126	.01132	.01138	.1615	.1615		DATA CX44/
5	.055	.11	.168	.191	.01025	.01325		DATA CX44/
6	.01113	.01200	.01213	.01225	.193	.179		DATA CX44/
7	.085	.128	.183	.205	.012	.0174		DATA CX44/
8	.01175	.01413	.0145	.01488	.208	.195		DATA CX44/
9	.111	.149	.198	.22	.01475	.025		DATA CX44/
A	.01338	.0163	.0169	.0175	.224	.213		DATA CX44/
B	.131	.162	.212	.234	.0185	.039		DATA CX44/
C	.015	.0212	.023	.0245	.239	.231		DATA CX44/
D	.15	.178	.227	.249	.025	.0595		DATA CX44/
E	.018	.032	.0345	.037	.255	.248		DATA CX44/
F	.169	.0855	.0938	.101	.036	.0885		DATA CX44/
G	.027	.2	.2415	.263	.27	.264		DATA CX44/
H	.191	.0855	.0938	.101	.0705	.131		DATA CX44/
I	.072	.22	.257	.277	.286	.282		DATA CX44/
J	.213	.130	.145	.160	.117	.166		DATA CX44/
1	.232	.238	.271	.291	.301	.299		DATA CX44/
2	.166	.177	.1825	.188	.162	.201		DATA CX44/
3	.251	.258	.286	.306	2*.3165			DATA CX44/
4	.202	.209	.213	.216	.209	.237		DATA CX44/
5	.272	.282	.301	.32	2*.332			DATA CX44/
6	4*.332	.32	2*.324		.29	.295		DATA CX44/
7	.33	.56	2*.566		2*.34	.52		DATA CX44/
8	4*.562	.56	2*.566		.51			DATA CX44/
9	.57	1.38	2*.386		2*.56			DATA CX44/
A	4*.1.296	1.38	2*.386		1.34	1.345		DATA CX44/
B	1.39	1.38	2*.386		2*.1.38			DATA CX44/

C	4*1.662,				1.604 ,	1.62 ,	DATE11630
D	1.65 ,	1.64 ,	2*1.646,		2*1.64 ,		DATE11640
E	4*1.812,				1.798 ,	1.80 ,	DATE11650
F	1.845 ,	1.835 ,	2*1.841,		2*1.835,		DATE11660
G	4*1.962,				1.915 ,	1.92 ,	DATE11670
H	1.96 ,	1.95 ,	2*1.956,		2*1.95 ,		DATE11680
I	4*2.022,				1.98 ,	1.985 ,	DATE11690
J	2.02 ,	2.01 ,	2*2.016,		2*2.01	/	DATE11700
	DATA CX47/	4*2.002,			1.955 ,	1.96 ,	DATE11710
1	2. ,	1.99 ,	2*1.996,		2*1.99,		DATE11720
2	4*1.847,				1.81 ,	1.82 ,	DATE11730
3	1.85 ,	1.84 ,	2*1.846,		2*1.84,		DATE11740
4	4*1.652,				2*1.61,		DATE11750
5	1.65 ,	1.64 ,	2*1.646,		2*1.64,		DATE11760
6	4*977 ,				.992 ,	1.01 ,	DATE11770
7	1.04 ,	1.03 ,	2*1.036,		2*1.03,		DATE11780
8	4*302 ,				.26 ,	.265 ,	DATE11790
9	.30 ,	.29 ,	2*2.296 ,		2*2.29 ,		DATE11800
A	4*217 ,				.196 ,	.2 ,	DATE11810
B	.236 ,	.226 ,	2*2.232 ,		2*2.226,		DATE11820
C	4*132 ,				.095 ,	.1 ,	DATE11830
D	.13 ,	.12 ,	2*2.126 ,		2*2.12 ,		DATE11840
E	4*077 ,				.05 ,	.03 ,	DATE11850
F	.06 ,	.055 ,	2*2.056 ,		2*2.055,		DATE11860
G	4*022 ,				2*2.01 ,		DATE11870
H	6*01/						DATE11880
	DATA K/1.1.1.1.1,2.3.4.5.7.8.9/						DATE11890
	DATA L/1.1.2.2.3.3.4.4.5.5.6.7.8.9.10.11.12/						DATE11900
	END						DATE11910

```

SUBROUTINE DET
COMMON /ST80/ UX,UY,UO,VO,T,A(9,2),N,NS
DOUBLE PRECISION C,UO,VO,UO,UX,UY,T,A,XM,B,XR,YO,XO
N1=N-1
K=2
UD=1,
VO=0,
DO 57 L=1,M1
J=K+L
JN=J+N
J1=J+1
K=K+N
IF(UY.NE.0.) GO TO 1
IF(A(J,1))43,42,43
DO 44 I=J1,K
IF(A(I,1))45,44,45
42 CONTINUE
GO TO 113
43 DO=-UO
IM=I-J
DO 46 I=J,NS,N
IMM=I+IM
B=A(I,1)
A(I,1)=A(IMM,1)
A(IMM,1)=B
44 UO=UO+A(J,1)
XO=-1./A(J,1)
DO 47 I=J1,K
IF(A(I,1).NE.0.) A(I,1) = A(I,1)*XO
47 CONTINUE
DO 48 M=JN,NS,N
IF(A(M,1))60,80,60
MJ=M-J
DO 41 I=J1,K
IF(A(I,1))49,41,49
49 IC=MJ+I
A(IC,1)=A(IC,1)+A(I,1)*A(M,1)
41 CONTINUE
80 CONTINUE
GO TO 57
1 IF(A(J,1).NE.0..OR. A(J,2).NE.0.) GO TO 16
DO 7 I=J1,K
IF(A(I,1).NE.0..OR. A(I,2).NE.0.) GO TO 15
7 CONTINUE
GO TO 113
15 UD=-UO
VO=-VO
IM=I-J
DO 19 I=J,NS,N
IMM=I+IM
ON 19 M=1,2
B=A(I,M)
A(I,M)=A(IMM,M)
19 A(IMM,M)=B

```

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DET00010
DET00020
DET00030
DET00040
DET00050
DET00060
DET00070
DET00080
DET00090
DET00100
DET00110
DET00120
DET00130
DET00140
DET00150
DET00160
DET00170
DET00180
DET00190
DET00200
DET00210
DET00220
DET00230
DET00240
DET00250
DET00260
DET00270
DET00280
DET00290
DET00300
DET00310
DET00320
DET00330
DET00340
DET00350
DET00360
DET00370
DET00380
DET00390
DET00400
DET00410
DET00420
DET00430
DET00440
DET00450
DET00460
DET00470
DET00480
DET00490
DET00500
DET00510
DET00520
DET00530
DET00540

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```

16 C=UD*A(J,1)-VD*A(J,2)
   VD=UD*A(J,2)+VD*A(J,1)
   UD=C
   IF(A(J,1))21,22,21
22 XD=0.
   YD=1./A(J,2)
   GD TO 23
21 XR=A(J,2)/ A(J,1)
   XM=(1.+XR*XR)*A(J,1)
   XD=-1./XM
   YD=XR/XM
23 DO 25 I=J1,K
27 B=XD*A(I,1) -YD* A(I,2)
   A(I,2)= XD*A(I,2)+YD*A(I,1)
   A(I,1)= B
25 CONTINUE
   DD 81 M=JN,NS,M
   IF(A(M,1).EQ.0..AND.A(M,2) .EQ. 0. ) GD TO 81
   MJ=M-J
   DO 27 I=J1,K
   IF(A(I,1).EQ.0..AND. A(I,2) .EQ. 0. ) GD TO 27
   IC=MJ+I
   A(IC,1)=A(IC,1)+A(I,1)*A(M,1)-A(I,2)*A(M,2)
   A(IC,2)=A(IC,2)+A(I,1)*A(M,2)+A(I,2)*A(M,1)
   CONTINUE
27 CONTINUE
81 CONTINUE
57 CONTINUE
113 IF(UY)56,55,56
55 UD=0.
14 JD=UD*A(NS,1)
   VD=0.
   RETURN
56 UD=UD*A(NS,1)-VD*A(NS,2)
   VD=UD*A(NS,2)+VD*A(NS,1)
   RETURN
   END

```

```

DET00550
DET00560
DET00570
DET00580
DET00590
DET00600
DET00610
DET00620
DET00630
DET00640
DET00650
DET00660
DET00670
DET00680
DET00690
DET00700
DET00710
DET00720
DET00730
DET00740
DET00750
DET00760
DET00770
DET00780
DET00790
DET00800
DET00810
DET00820
DET00830
DET00840
DET00850
DET00860
DET00870
DET00880
DET00890
DET00900

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SUBROUTINE DISK (GDISK)
  DIMENSION GDISK(120)
  DISPLAY GUST VELOCITY DISTRIBUTION ON ROTOR (IF ANY VELOCITY
  IS NON-ZERO AND IF WHOLE ROTOR IS NOT SUBJECT TO THE
  SAME VELOCITY)
  DISK1=GDISK(119)
  DO 227 J=1,120
    IF (ABS(GDISK(J)).GT.0.5.AND.GDISK(J).NE.DISK1) GO TO 228
  227 CONTINUE
  228 RETURN
  229 WRITE(6,229) GDISK
  229 FORMAT( 1H1,10X,30H GUST VELOCITIES ON ROTOR DISK, 10X,4H FWD//
    1 30X,F4.0,16X,F4.0,16X,F4.0/32X,F4.0,16X,F4.0,16X,F4.0//
    2 34X,F4.0,12X,F4.0,12X,F4.0/36X,F4.0,10X,F4.0,10X,F4.0//
    3 38X,F4.0, 8X,F4.0, 8X,F4.0/10X,F4.0,26X,F4.0, 6X,F4.0,
    4 6X,F4.0,26X,F4.0/14X,F4.0,68X,F4.0/18X,F4.0,20X,F4.0,
    5 8X,F4.0, 4X,F4.0,20X,F4.0/22X,F4.0,52X,F4.0/26X,F4.0,
    6 14X,F4.0, 2X,F4.0, 2X,F4.0,14X,F4.0/30X,F4.0,36X,F4.0/
    7 34X,F4.0, 8X,3F4.0,8X,F4.0/38X,F4.0,23X,F4.0/42X,5F4.0/
    8 42X,2F8.0/10X,10F4.0,4X,10F4.0/42X,2F8.0/
    9 42X,5F4.0/38X,F4.0,20X,F4.0/34X,F4.0, 8X,3F4.0,8X,F4.0/
    A 30X,F4.0,36X,F4.0/28X,F4.0,14X,F4.0, 2X,F4.0, 2X,F4.0,
    B 14X,F4.0/22X,F4.0,52X,F4.0/18X,F4.0,20X,F4.0, 4X,F4.0,
    C 4X,F4.0,20X,F4.0/14X,F4.0,68X,F4.0/10X,F4.0,26X,F4.0,
    D 6X,F4.0, 6X,F4.0,26X,F4.0/38X,F4.0, 8X,F4.0, 8X,F4.0//
    E 36X,F4.0,10X,F4.0,10X,F4.0/34X,F4.0,12X,F4.0,12X,F4.0//
    F 32X,F4.0,14X,F4.0,14X,F4.0/30X,F4.0,16X,F4.0,16X,F4.0//
    G 50X,4H AFT)
  END

```


00GS0010
00GS0020
00GS0030
00GS0040
00GS0050
00GS0060
00GS0070

SUBROUTINE DOGS (RX,RY,RZ,FX,FY,FZ,ROLL,PITCH,YAW)
COMPUTE VECTOR CROSS PRODUCT L = R X F
ROLL=RY*FZ-RZ*FY
PITCH=RZ*FX-RX*FZ
YAW=RX*FY-RY*FX
RETURN
END

```

SURROUTINE DOROT (N)
COMMON /ANDOIT/ A1,B1,XK,XY,V12,V14,APOM,APFM,AROM,ARFM,
1 AYFM,ROTI,XK43,XLIM,CBFAC,
2 GOISK(122),NPSI,TANAL,TANBL,
3 TANT1,TANT2,DCAF,XK,IPRINT,NORAO,
4 SHEAR(12),SHEAR(12),SHEAR(12),
5 XHOML(12),XHOML(12)
6 *APDS,ARDS,PFAC,REFAC,APDS,ARDS
COMMON /ROMAN/
1 Z2,VXS(2),VYS(2),VZS(2),BETA(12,2),
2 T,PCC(2),CDE(7,7,2),BETAN(2),BETAX(2),BETAZ(2),
3 AIB(2),APDD,AROD,AYOD,AIR(2),
4 DPSI(12,2),DTRR,NPSI(2),ZZTR,
5 BETAD(12,2),BNPSI(2),
6 COND?,CHAXV,RATE1,RATE2,STOP2,
7 THROT(2),TRIND,XGUST,BETAZD(2),GMAXV1,
8 GMAXV?,CHAXV3,GUSTYP,HMPSIR(2),
9 HUBKPS,HUBKRS,HUBTPS,HUBTRS,
10 KONFIG,LNGTH1,PILGH1,PSIREF(2),
11 START2,XHOML(12,2),
12 R(2),OR(2),T1(2),
13 T2(2),TZR(2),XMA(2),
14 XMB(2),AIBP(2),AIBR(2),
15 APDR(2),ARDR(2),PSID(2),
16 XSTAH(2),YSTAH(2),
17 HUBKPR(2),HUBKRR(2)
18 *AZETAR(2),YZETAR(2)
COMMON /MANARO/
1 I,V,INO,MWAG,APMT,ARBMT,AVBMT,BETAD(2),TDELT,
2 BETAE(2),MGUSTE,MGUSTF,MGUSTW,VGUSTE,
3 VGUSTF,YGUSTF,GFND,GLAT,GVERT,
4 VX8,VZ8,APD,VYB,ARD,AYD,
5 COLSTK,CYSTK1,CYSTK2,PEDAL,AYE,
6 APE,ARE,AIM,BIM,ALTR,BITR,
7 XAR(2),YAR(2),ZAR(2),
8 VIR(2),ZETAR(2),NFORCE(2),
9 THRUST(2),TORQUE(2),YFORCE(2),
10 J,W,ITM,VHS(2),LINK,OELE,VROT(2),
11 VSNO,YFIN(2),ZFEL(2),AIBAL(2),
12 B1BAL(2),CONO1,SWING,PILGH2,PWCELL,
13 B(2),PHOM(2),RMOM(2)
COMMON /ROSTAR/
1 AM(2),CT,PI,XB(2),ALT,ADR(2),EXH(2),
2 NXR(2),RBH(2),SWC(2),UHS,COHB(2),LROT(2),
3 RAI(2),RTRP(2),TATR(14),CDNEK(2),OCAFR(2),FVIND,
4 NVARD,
5 SWKR1(2),SWKR2(2),TIPIB(2),TIPIB(2),
6 TWIST(20,2),CLRADK(2),DELTA3(2),
7 LAMBDA(2),UPGUST,URGUST,UTGUST,WROTOR,
8 ER(2),ERX(2),
9 XLIMAX(2),XLIMIN(2)
COMMON /TOPILOT/
1 AH(3),AL(3),EXIT,ICOM(49),IPSN,
2 NPART,NVARA,NVARB,NVASC,NSCALE,
3 NVARS,NPRINT,NTIME
COMMON /FORY/
1 Y(4,15D)
COMMON /LOISK/LOCATE(12D)
DATA TWOPI,0.45,0.105,0.255,0.315 /6.2831853,7.8539816,1.8325957,

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1 4.4505896,5.4977871/
  DIMENSION HUBKSI(2,2),JFLAP(7)
  EQUIVALENCE (HUBKS(1,1),HUBKPS)
  REAL LAM,MRCP,MRCPSB,MRCPCB,LENGTH1,LAMBDA
  REAL NOPS12
  LOGICAL NRIGID
  NRIGID=.TRUE.
  IF(BETAX(N).EQ.BETAN(N)) NRIGID=.FALSE.
  IJ = 1
  ADMOM = 0.0
  PSIDSQ = PSID(N)**2
  NPSI2=2./NPSI
  IF(LINK.LT.4) GO TO 9
  DO 10 L=1,NPSI
    JFLAP(L)=0
    IF(NRIGID) GO TO 5
    BETAIL(N)=BETAZ(N)
    BETAD(L,N)=BETAZD(N)
  GO TO 10
5  CONTINUE
  IF(BETA(L,N).LT.BETAN(N)) GO TO 2
  IF(BETA(L,N).LT.BETAX(N)) GO TO 10
  JFLAP(L)=1
  DBETA=BETAX(N)-BETA(L,N)
  DBETAD=0.
  IF(BETAD(L,N).GT.0.) DBETAD=-BFTAD(L,N)
  GO TO 3
2  CONTINUE
  JFLAP(L)=-1
  DBETA=BETAN(N)-BETA(L,N)
  DBETAD=0.
  IF(BETAD(L,N).LT.0.) DBETAD=-BETAD(L,N)
3  CONTINUE
  DO 4 K=1,NPSI
    BETAK(N)=CDBE(K,L,N)*DBETA+BETA(K,N)
    BETAD(K,N)=CDBE(K,L,N)*DBETAD+BFTAD(K,N)
4  CONTINUE
10 CONTINUE
9  CONTINUE
  DO 40 L=1,NPSI
    PSIR=PSIREF(N)+DPSI(L,N)
    IF(PSIR.GE.TWOPI) PSIR=PSIR-TWOPI
    VXOR=VIR(N)
    IF((PSIR.GT.045.AND.PSIR.LT.0105).OR.
1  (PSIR.GT.0255.AND.PSIR.LT.0315))
2  VXOR=VXOR+VX* SIN(6.*(PSIR-045))
    SPST=STN(PSIR)
    CPSI=COS(PSIR)
    IF(LINK.EQ.4) GO TO 27
    IF(NRIGID) GO TO 26
    BETAIL(N)=BETAZ(N)
    BETAD(L,N)=BETAZD(N)
  GO TO 27
26 CONTINUE
27 CONTINUE

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DOR00550
DOR00560
DOR00570
DOR00580
DOR00590
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DOR00990
DOR01000
DOR01010
DOR01020
DOR01030
DOR01040
DOR01050
DOR01060
DOR01070
DOR01080

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IF(UT.NE.O..OR.UPT.NE.O.) PHI=ATAN2(UPT,UT)
USGAM=USGAM
XMACN=USGAM*VSND
XMACR=USGAM*VSND
PHIR=0.
IF(UR.NE.O..OR.UPT.NE.O.) PHIR=ATAN2(UPT,UR)
IF(RR.GT.EXH(N)) GO TO 14
ALF=0.
CL=0.
CD=C*HB(N)
CLR=0.
CDR=CD
GO TO 15
14 CONTINUE
ALF=TZTN*PHI
CALL CLCD (ALF,CL,CD,XMACN,EXIT,N)
IF(EXIT.NE.O.) RETURN
IF(CLRADK(N).GE.O.) CALL CLCD (PHIR,CLR,CDR,XMACR,EXIT,N)
IF(EXIT.NE.O.) RETURN
CLR=CLR+CLRADK(N)
15 CONTINUE
ALDADL=USGAM*(CL*UT+CD*UPT)+CGAMCT*(CLR*UR+CDR*UPR)
ALDADO=USGAM*(CD*UT-CL*UPT)
ALDADR=CGAMCT*(CDR*UR-CLR*UPR)
ALDLR=ALDADL*RR
ALDDR=ALDADO*RR
IF(K.NE.2) GO TO 20
SHEAR(L)=TIP38(N)*SHEAR(L)+TIP18(N)*ALDADL
SHEARD(L)=.375*SHEAR(L)+.125*ALDADO
SHEARR(L)=.375*SHEARR(L)+.125*ALDADR
XMOM(L)=TIP38(N)*XMOM(L)+TIP18(N)*ALDLR
XMOMD(L)=.375*XMOMD(L)+.125*ALDDR
20 SHEAR(L)=SHEAR(L)+ALDADL
SHEARD(L)=SHEARD(L)+ALDADO
SHEARR(L)=SHEARR(L)+ALDADR
XMOM(L)=XMOM(L)+ALDLR
XMOMD(L)=XMOMD(L)+ALDDR
IF(IPRINT.EQ.O) GO TO 30
PHI=PHI+DTRR
ALF=ALF+DTRR
WRITE (6,407) XR,PHI,ALF,CL,CD,XMACN,VXOR,LAM,UT,UP
IF(CLRADK(N).LT.O.) GO TO 30
GAMMA=GAMMA+DTRR
PHIR=PHIR+DTRR
WRITE (6,408) GAMMA,PHIR,CLR,CDR,XMACR,UR,UPR,UPT
30 CONTINUE
XMOM(L)=XMOM(L)+HMPSTR(N)
BMOM=(HUBKPR(N)*CPSI**2+HUBKRR(N)*SPSI**2)*BETAL*NOPSI2
PMOM(N)=PMOM(N)-BMOM*CPSI
RMOM(N)=RMOM(N)-BMOM*SPSI
AMFAC=(CBFAC*CBETA+SRFAC*SBETA)*NOPSI2
XMOM=XMOM(L)-BMOM-AM(N)*AMFAC
CBETA2=(CBETA+HUBKS(1,N))*NOPSI2
XMOM1=CBETA2*(ARDH*CPSI-APDM*SPSI)*CBETA

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DOR02170
DOR02180
DOR02190
DOR02200
DOR02210
DOR02220
DOR02230
DOR02240
DOR02250
DOR02260
DOR02270
DOR02280
DOR02290
DOR02300
DOR02310
DOR02320
DOR02330
DOR02340
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DOR02380
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DOR02400
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DOR02500
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DOR02580
DOR02590
DOR02600
DOR02610
DOR02620
DOR02630
DOR02640
DOR02650
DOR02660
DOR02670
DOR02680
DOR02690
DOR02700

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XMOML(I(L,N))=XMOH*RAI(B(N))+XMOH1-CBETA2*S8ETA*PSIDSQ
XMOH2=XMOH+XMOH1+AIB(N)
XMA(N)=XMA(N)+XMOH2*SPSI
XMB(N)=XMB(N)+XMOH2*CPST
TORQUE(N)=TORQUE(N)+XMOH(L)
THRUST(N)=THRUST(N)+SHEAR(L)*CBETA-SHEAR(L)*S8ETA
SHLSRC=SHEAR(L)*S8ETA+SHEAR(L)*CBETA
YFORCE(N)=YFORCE(N)-SHEAR(L)*CPST-SHLSRC*SPSI
HFORCE(N)=HFORCE(N)+SHEAR(L)*SPST-SHLSRC*CPST
ADXMOM = ADXMOM +XMOH(L)
IF(NRIGID) GO TO 40
XMOBH=XMOH(L,N)*RBH(N)
PMO4(N)=PMO(N)+XMOBH*CPST
PMO(N)=PMO(N)+XMOBH*SPST
XMOH(L,N)=0.
40 CONTINUE
OSQ=PSIDSQ*AIB(N)
ADXMOM=ADXMOM/NOPSI
DO 41 K=1,3
CR0=COS(BETA0(N))
SR0=SIN(BETA0(N))
CB0H=CB0+H0KS(1,N)
FBE=CONK(N)*BETA(N)-ADXMOM*CR0H*S80*OSQ
FBF=CONK(N)+OSQ*(CB0H*CB0-S80**2)
BETA(N)=BETA(N)-FBE/SPRE
BETA0(N)=BETA(N)+BETA(N)
41 CONTINUE
IF(LINK.LT.4) RETURN
DO 61 L=1,NOPSI
Y(L,7*N+L+99)=OOTX(COSE(1,L,N),1,XMOH(L,N),1,NOPSI)
61 CONTINUE
IF(.NOT.NRIGID) RETURN
DO 62 L=1,NOPSI
IF(Y(L,7*N+L+99)*JFLAP(L),LE.0.) GO TO 62
PSIR=PSIREF(N)+PSI(L,N)
XMOBH=Y(L,7*N+L+99)*RBH(N)
PMO4(N)=PMO(N)+XMOBH*COS(PSIR)
PMO(N)=PMO(N)+XMOBH*SIN(PSIR)
XMOH(L,N)=0.
JFLAP(L)=10
62 CONTINUE
DO 63 L=1,NOPSI
Y(L,7*N+L+99)=OOTX(COSE(1,L,N),1,XMOH(L,N),1,NOPSI)
IF(JFLAP(L),NE.10) GO TO 63
PSIR=PSIREF(N)+PSI(L,N)
XMOBH=Y(L,7*N+L+99)*RBH(N)
PMO4(N)=PMO(N)+XMOBH*COS(PSIR)
PMO(N)=PMO(N)+XMOBH*SIN(PSIR)
Y(L,7*N+L+99)=0.
63 CONTINUE
RETURN
407 FORMAT (6X,10F12.5)
408 FORMAT (24X,8F12.5)
424 FORMAT (12X, , AZIMUTH , U-SHAFT , V-SHAFT , W-SHAFT

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DOR03250
 DOR03260
 DOR03270
 DOR03280
 DOR03290
 DOR03300
 DOR03310


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SUBROUTINE ELEC (GAIN)
COMMON /TRONIC/ UU(6),VV(6),TAU(22),DAMP(22),NUMRTS,GAINB,
1 INDEX,STGAIN(6),TSTAR,COELTD,SLOT(3,9)
GAIN=1
IX=INC
DO 20 IX=IX
U=UU(1)
V=VV(1)
IF(V.EQ.0.) GO TO 15
IF(V.NE.-VV(1+1)) GO TO 18
Z=1./(U**2+V**2)
TAU(IX)=Z
DAMP(IX)=-2.*Z*U
GAIN=GAIN/Z
GO TO 20
15 CONTINUE
DAMP(IX)=-1./U
GAIN=-GAIN*U
GO TO 19
18 CONTINUE
DAMP(IX)=0.
19 CONTINUE
TAU(IX)=0.
20 CONTINUE
IF(NUMRTS-GE.3) RETURN
IX=IX+1
TAU(IX)=0.
DAMP(IX)=0.
UU(3)=0.
VV(3)=0.
RETURN
END

```

ELEC0010
ELEC0020
ELEC0030
ELEC0040
ELEC0050
ELEC0060
ELEC0070
ELEC0080
ELEC0090
ELEC0100
ELEC0110
ELEC0120
ELEC0130
ELEC0140
ELEC0150
ELEC0160
ELEC0170
ELEC0180
ELEC0190
ELEC0200
ELEC0210
ELEC0220
ELEC0230
ELEC0240
ELEC0250
ELEC0260
ELEC0270
ELEC0280
ELEC0290
ELEC0300
ELEC0310
ELEC0320
ELEC0330

SUBROUTINE GUST (J)		
COMMON /STAMAN/	HL(2),XX,YY,AYI,GOV,KPD,QPC,QOO,	GUST0010
1	RIY,APBG,ARBG,ASEP,AYBG,BWTC,	GUST0020
2	RC,BWTK,RMTM,CGBL,DPIX,DPIZ,	GUST0030
3	FHPT(2),R550,ALERT,AYDMX,DELT2,	GUST0040
4	DPIXZ,DTBWT,DWLCG,MOELT,HGUST,	GUST0050
5	HLTR1,HLTR2,ITORS,KTCR,OMEGM,	GUST0060
6	PCDEL,QMRS,ARMAS,TRALT,TWOPI,VGUST,	GUST0070
7	ISTOP,XAGUN,XAPYL,XARSP(2),YAGUN,	GUST0080
8	YARSP(2),YGUST,ZAGUN,ZAPYL,ZARSP(2),	GUST0090
9	DELT2R,OSTACG,ETIMAST,GPRELD,HLPLYD,	GUST0100
A	IBRAKE,OMEGMD,ORRAKE,BETAZS(2),	GUST0110
B	PCGOEN,PCGMX,PCRATE,PJIDTR,RDELT1,	GUST0120
C	RDELT2,RITORS,TQIND2	GUST0130
COMMON /MANAL/		GUST0140
1	O,AP,PED,QWG,TZM,TIM,T2M,	GUST0150
2	TZT,T1T,T2T,ALEL,CZET,PSDD,	GUST0160
3	SZET,TAXL,TAXR,XAWG,XLNK(16),ZAWG,	GUST0170
4	ALCYP,ALFIN,ALLWG,ALRWG,CDELE,CDFIN,	GUST0180
5	CDLWG,CDRWG,CLELE,CLFIN,CLLWG,CLRWG,CHING,	GUST0190
6	CYCRI,CYCR2,CZET4,CZET6,CZET9,RANGE,	GUST0200
7	SZET5,SZET7,SZET8,WGCOL,XAELE,XAFIN,	GUST0210
8	XAFUS,XAJET,YAFIN,ZAELE,ZAFIN,ZAFUS,	GUST0220
9	YAELE,YAFUS,YALWG,YARWG,YALJET,YARJET,	GUST0230
A	ZAJET,ALECR1,ALGFPD,BOTTOM,CZET11,	GUST0240
B	CZET12,CZET13,EIZETA,HALFPI,SZET10,	GUST0250
C	XAPYLD,YGUSTW,ZAPYLD,ZFLWGI,ZFRWGI	GUST0260
COMMON /ROMAN/		GUST0270
1	.TZMS,TIMS,T2MS,TZTS,T1TS,T2TS,	GUST0280
2	CLOCK,FLOCK,XLOCK,XCLOCK	GUST0290
3	ZZ,VXS(2),VVS(2),VZS(2),BETA(12,2),	GUST0300
4	T,PCC(2),COSE(7,7,2),BETAN(2),BETAX(2),BETAZ(2),	GUST0310
5	AIB(2),APDD,AROD,AYDD,AIR(2),	GUST0320
6	NPSI(12,2),DTRR,NPSI(2),ZZTR,	GUST0330
7	BETAD(12,2),BNPSI(2),	GUST0340
8	COND2,GMAXV,RATE1,RATE2,STOP2,	GUST0350
9	THROT(2),TRIND,XGUST,BETAZD(2),GMAXV1,	GUST0360
A	GMAXV2,GMAXV3,GUSTYP,HNPSIR(2),	GUST0370
B	HUBKPS,HUBKRS,HUBTPS,HUBTRS,	GUST0380
C	KDNFIG,LNGTH1,PILGHI,PSIREF(2),	GUST0390
D	START2,XMOMLI(12,2),	GUST0400
E	RM,RTR,ORM,ORT,TIME,T1TT,	GUST0410
F	T2MT,T2TT,TZMT,TZTT,XMAL,XMAIT,	GUST0420
1	XMB1,XMB1T,AIBPM,AIBPT,AIBRM,AIBRT,	GUST0430
2	APT0,APT0D,ARTD,ARTD,PSD,PSDT,	GUST0440
3	XSTAHM,XSTANT,YSTAHM,YSTANT,	GUST0450
4	HUBKP,HUBKTP,HUBKR,HUBKTR	GUST0460
5	AZETA,AZETAT,VZETA,VZETAT	GUST0470
6	I,V,IND,NWAG,APRMT,ARBMT,AYBMT,BETA0(2),TDELT,	GUST0480
7	RETAE(2),HGUSTE,HGUSTF,HGUSTW,VGUSTE,	GUST0490
8	VGUSTW,YGUSTF,GFWD,GLAT,GVERT,	GUST0500
9	VXB,VZB,APD,VYB,ARD,AYD,	GUST0510
A	COLSTK,CYSTK1,CYSTK2,PEDAL,AYE,	GUST0520
B	APE,ARE,AIM,BIM,A1TR,B1TR,	GUST0530
C	XAR(2),YAR(2),ZAR(2),	GUST0540
D	VIMR,V1TR,ZETA,ZETATR,HMR,HTR,	

```

R      REAL LENGTH
      DIMENSION XSTA(7), AGUST(7)
      XSTA(1)=SORT(XX**2+YY**2)-XGUST
      CALL RATS (XAR(1),YAR(1),ZAR(1),AYE,APE,ARE,STA,BL,TV,1)
      XSTAHM=XX+STA
      YSTAHM=YY+BL
      CALL RATS (XAR(2),YAR(2),ZAR(2),AYE,APE,ARE,STA,BL,TV,1)
      XSTAHT=XX+STA
      YSTAHT=YY+BL
      CALL RATS (XAFIN,YAFIN,ZAFIN,AYE,APE,ARE,STA,BL,TV,1)
      XSTA(2)=SORT(XX+STA)**2+(YY+BL)**2)-XGUST
      CALL RATS (XAELE,O.,ZAELE,AYE,APF,ARE,STA,BL,TV,1)
      XSTA(3)=SORT(XX+STA)**2+(YY+BL)**2)-XGUST
      CALL RATS (XANG,O.,ZANG,AYE,APE,ARE,STA,BL,TV,1)
      XSTAW= SORT(XX+STA)**2+(YY+BL)**2)-XGUST
      K=7
      IF(OMG.LT.Q) K=4
      DO 208 M=1,4
      AGUST(M)=0.
      AGUST(M+3)=0.
      BILL=M
      IF(OMG.LT.Q) BILL=2.
      208 XSTA(M+3)=XSTAW+(.5-.25*BILL)*CWING
      GUSTVP=J
      IF(J.EO.10.OR.J.EO.12) GO TO 224
      DO 207 M=1,K
      IF(XSTA(M).GE.LENGTH1) GO TO 100
      IF(XSTA(M).LE.O.) GO TO 207
      AGUST(M)=XSTA(M)*RATE1
      GO TO 207
      100 IF(XSTA(M).GE.STOP2) GO TO 101
      IF(XSTA(M).LE.START2) GO TO 102
      AGUST(M)=GMAXV3+XSTA(M)*RATE2
      GO TO 207
      101 AGUST(M)=GMAXV
      GO TO 207
      102 AGUST(M)=GMAXV1
      207 CONTINUE
      GO TO 232
      224 DO 206 M=1,K
      IF(XSTA(M).GT.O.O.AND.XSTA(M).LT.LENGTH1)
      1 AGUST(M)=GMAXV1*(SIN(XSTA(M)*PI/LGH1))**2
      IF(XSTA(M).GT.START2.AND.XSTA(M).LT.STOP2)
      1 AGUST(M)=GMAXV2*(SIN(XSTA(M)-START2)*PI/LGH1))**2
      206 CONTINUE
      232 AGUSTW=AGUST(4)
      IF(K.EO.7) BGUSTW=.25*(AGUST(4)+AGUST(5)+AGUST(6)+AGUST(7))
      IF(J.GT.10) GO TO 233
      CALL PATS (O.O.,BGUSTW,AYE,APE,ARE,HGUSTW,YGUSTW,VGUSTW,-1)
      CALL PATS (O.O.,AGUST(3),AYF,APE,ARE,HGUSTE,TV,VGUSTE,-1)
      CALL RATS (O.O.,AGUST(2),AYE,APE,ARE,HGUSTF,YGUSTF,TV,-1)
      CALL PATS (O.O.,AGUST(1),AYE,APE,ARE,HGUST,YGUST,VGUST,-1)
      RETURN

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GUST0550
 GUST0560
 GUST0570
 GUST0580
 GUST0590
 GUST0600
 GUST0610
 GUST0620
 GUST0630
 GUST0640
 GUST0650
 GUST0660
 GUST0670
 GUST0680
 GUST0690
 GUST0700
 GUST0710
 GUST0720
 GUST0730
 GUST0740
 GUST0750
 GUST0760
 GUST0770
 GUST0780
 GUST0790
 GUST0800
 GUST0810
 GUST0820
 GUST0830
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 GUST0860
 GUST0870
 GUST0880
 GUST0890
 GUST0900
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 GUST0970
 GUST0980
 GUST0990
 GUST1000
 GUST1010
 GUST1020
 GUST1030
 GUST1040
 GUST1050
 GUST1060
 GUST1070
 GUST1080

GUST1090
GUST1100
GUST1110
GUST1120
GUST1130
GUST1140

233 CALL RATS (BGUSTW,0.,0.,.AYE,APF,ARE,HGUSTW,YGUSTW,VGUSTW,-1)
CALL RATS (AGUST(3),0.,0.,.AYE,APF,ARE,HGUSTE,TV,VGUSTE,-1)
CALL RATS (AGUST(2),0.,0.,.AYE,APF,ARE,HGUSTF,YGUSTF,TV,-1)
CALL RATS (AGUST(1),0.,0.,.AYF,APF,ARE,HGUST,YGUST,VGUST,-1)
RETURN
END

SUBROUTINE INIT		COMMON /FORCE/ A(71)	
COMMON /STRIMA/		COMMON /ROMAN/	
1	OMR,XXD,YVD,ZZD,ALGF,APFP,AYFP,	1	Q,AP,PED,OMG,TZM,TIM,T2M,
2	CGML,COLL(6),CYCF(3),CYCL(3),	2	TZT,T1T,T2T,ALEL,CZET,PSDD,
3	DIST,KCIT(20),PEDA(3),QMAX,	3	SZET,TAXL,TAXR,XANG,XLNG(16),ZANG,
4	QMR, TIM, TMAX, XCIT(20,6), ALGEZ,	4	ALCYP,ALFIN,ALLWG,ALRWG,CDELE,CDFIN,
5	ALGE1,ALGE2,CGSTA,CPMIC,DIXIZ,	5	CDLWG,CDRWG,CLELE,CLFIN,CLLWG,CLRWG,CWING,
6	DIYIX,DIZIY,DTZMT,DTZM1,DTZT1,FKTS,	6	CYCR1,CYCR2,CZET4,CZET6,CZET9,RANGE,
7	HUBKM(2,2),HUBKI(2,2),	7	SZET5,SZET7,SZET8,WGCOL,XAELE,XAFIN,
8	KREAD,PIU30,TSTAR(14),ZMAX2,ZMAX3,	8	XAFUS,XAJET,YAFIN,ZAELE,ZAFIN,ZAFUS,
9	ASECDL,CYPNIC,GFARAT,PSD550,	9	YAELE,YAFUS,YALWG,YARWG,YALJET,YARJET,
1	PSISTP,OXBRK,RUDIND,ZDELT1,ZDELT2	10	ZAJET,ALECR1,ALGFPD,BOTTOM,CZET11,
2	HL(2),XX,YV,AY1,GOV,KPD,OPC,QOO,	11	CZET12,CZET13,EIZETA,HALFPI,SZET10,
3	RC,BWTK,BWTM,CGAL,DPIX,DPIZ,	12	XAPYLD,YGUSTW,ZAPYLD,ZFLWGL,ZFRWG1
4	FHPT(2),R550,ALERT,AYDNX,DELT2,	13	.TZMS,TIMS,T2MS,TZTS,T1TS,T2TS,
5	DPIXZ,DTBMT,DMLCG,MDELT,HGUST,	14	CLOCK,FLOCK,XLOCK,TCLOCK
6	HLTR1,HLTR2,ITORS,KTCCTR,DMECH,	15	ZZ,VXS(2),VYS(2),VZS(2),BETA(12,2),
7	PCDEL,OMRSA,RMASS,TRALT,TWDPI,VGUST,	16	T,PCC(2),COSE(7,7,2),BETAN(2),BETAX(2),BETAZ(2),
8	ISTOP,XAGUN,XAPYL,XARSP(2),YAGUN,	17	AI8(2),APDD,ARDD,AYDD,AIR(2),
9	VARSP(2),YGUST,ZAGUN,ZAPYL,ZARSP(2),	18	DPSI(12,2),OTRR,NPSI(2),ZZTR,
10	DELT2R,OSTACG,EIMAST,GPRELD,MLPYLD,	19	BETA5(12,2),BNPSI(2),
11	IBRAKE,OMEGMO,QBRAKE,BETAZS(2),	20	CONO2,GMAXV,RATE1,RATE2,STOP2,
12	PCGDED,PCGMAX,PCRATE,POIDTR,ROELT1,	21	THROT(2),TRIND,XGUST,BETAZD(2),GMAXV1,
13	ROELT2,RIORS,TRIND2	22	GMAXV2,GMAXV3,GUSTYP,HNPISIR(2),
14		23	HUBKPS,HUBKRS,HUBTPS,HUBTRS,
15		24	KONFIG,LNGTH1,PILGH1,PSIREF(2),
16		25	STAR2,XMOMLI(12,2),
17		26	RM,RTR,ORM,ORTR,TIMT,T1TT,
18		27	T2MT,T2TT,TZMT,TZTT,XMAL,XMALT,
19		28	XMB1,XMB1T,AIBPM,AIBPT,AIBRM,AIART,

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C      APTD,APITD,ARID,ARTID,PSD,PSDT,
D      XSTAHM,XSTAHT,YSTAHM,YSTAHT,
F      HURKP,HURKTP,HUBKR,HUBKTR
F      ,AZETA,AZETAT,VZETA,VZETAT
COMMON /MANARD/ I,V,IND,NVAG,APRMT,AR8MT,AY8MT,RETA0(2),TOELT,
1      BETAE(2),HGUSTE,HGUSTF,HGUSTM,VGUSTE,
2      VGUSTM,VGUSTF,GFWD,GLAT,GVERT,
3      VXB,VXB,APD,VVB,ARO,AYD,
4      COLSTK,CYSTK1,CYSTK2,PEDAL,AYE,
5      APE,ARE,AIM,BIM,AITR,BITR,
6      XAR(2),YAR(2),ZAR(2),
7      VIMR,VITR,ZETA,ZETATR,HMR,HTR,
8      TMR,TTR,OMX,QTR,YMRF,YTRF
COMMON /TOPLOT/ AH(3),AL(3),EXIT,ICOM(49),IPSN,
1      NPART,NVARA,NVARB,NVARC,NSCALE
1      ,NVAR5,NPRINT,NTIME
COMMON /FORV/ Y(4,150)
DATA HEAD1/ , MAIN
DATA DTRR1/57.2957795/
DATA DTR /-.1745329E-01/
DIMENSION HEAD1(2,6),PAR(191)
DO 78 J=1,7
PAR(J+135)=0.
PAR(J+142)=Y(1,J+106)*DTRR1
PAR(J+149)=Y(1,J+11)*DTRR1
PAR(J+156)=Y(1,J+17)*DTRR1
PAR(J+163)=0.
PAR(J+170)=Y(1,J+113)*DTRR1
PAR(J+177)=Y(1,J+38)*DTRR1
PAR(J+184)=Y(1,J+24)*DTRR1
78 CONTINUE
DO 91 N=1,2
NPSIN=NPSI(N)
IF(NPSIN.EQ.0.) GO TO 91
K=28*N+107
DO 90 J=1,NPSIN
K=K+1
PAR(K)=(Y(1,N*6)+DPSI(J,N))*DTRR1
IF(PAR(K).GE.360.) PAR(K)=PAR(K)-360.
IF(PAR(K).LT.0.) PAR(K)=PAR(K)+360.
90 CONTINUE
91 CONTINUE
DO 79 J=1,3
JJ=4-J
PAR(J+70)=Y(1,J+89)
PAR(J+76)=Y(1,J+14)
PAR(J+82)=Y(1,J+75)
PAR(J+85)=Y(1,JJ+78)*DTRR1
PAR(J+89)=Y(1,J)
PAR(J+92)=Y(1,JJ+3)*DTRR1
PAR(J+96)=Y(1,J+84)*DTRR1
PAR(J+99)=Y(1,J+ 9)*DTRR1
79 CONTINUE
PAR(1)=APTD*DTRR
INITC550
INITO560
INITO570
INITO580
INITO590
INITO600
INITO610
INITO620
INITO630
INITO640
INITO650
INITO660
INITO670
INITO680
INITO690
INITO700
INITO710
INITO720
INITO730
INITO740
INITO750
INITO760
INITO770
INITO780
INITO790
INITO800
INITO810
INITO820
INITO830
INITO840
INITO850
INITO860
INITO870
INITO880
INITO890
INITO900
INITO910
INITO920
INITO930
INITO940
INITO950
INITO960
INITO970
INITO980
INITO990
INIT1000
INIT1010
INIT1020
INIT1030
INIT1040
INIT1050
INIT1060
INIT1070
INIT1080

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PAR(2)=ARTD*DTTR
 PAR(3)=VXS(1)
 PAR(4)=Y(1.84)*DTTR
 PAR(5)=Y(1.107)*DTTR
 PAR(6)=TMR
 PAR(7)=AIM*DTTR
 PAR(8)=BIM*DTTR
 PAR(9)=VVS(1)
 PAR(10)=Y(1.9)*DTTR
 PAR(11)=Y(1.32)*DTTR
 PAR(12)=HMR
 PAR(13)=VZS(1)
 PAR(14)=Y(1.7)*DTTR
 PAR(15)=Y(1.18)*DTTR
 PAR(16)=YHMF
 PAR(17)=TZM*DTTR
 PAR(18)=TIM*DTTR
 PAR(19)=TZM*DTTR
 PAR(20)=BETA0(1)*DTTR
 PAR(21)=ZETA*DTTR
 PAR(22)=OMX
 PAR(31)=TZMT*DTTR
 PAR(32)=TIMT*DTTR
 PAR(33)=TZMT*DTTR
 PAR(23)=PAR(31)-PAR(17)
 PAR(24)=PAR(32)-PAR(18)
 PAR(25)=PAR(33)-PAR(19)
 PAR(26)=VIMR
 PAR(27)=PSD*PIU30
 PAR(28)=QMX*PSD550
 PAR(29)=BETAX(1)*DTTRP
 PAR(30)=HUBKP*DTTR
 PAR(34)=BETAN(1)*DTTR
 PAR(35)=HUBKR*DTTR
 PAR(36)=APTTD*DTTR
 PAR(37)=ARTTD*DTTR
 PAR(38)=VXS(2)
 PAR(39)=PAR(4)*GEARAT
 PAR(40)=Y(1.114)*DTTR
 PAR(41)=YTR
 PAR(42)=AITR*DTTR
 PAR(43)=BITR*DTTR
 PAR(44)=VVS(2)
 PAR(45)=PAR(10)*GEARAT
 PAR(46)=Y(1.39)*DTTR
 PAR(47)=HTR
 PAR(48)=VZS(2)
 PAR(49)=Y(1.6)*DTTR
 PAR(50)=Y(1.25)*DTTR
 PAR(51)=YTRF
 PAR(52)=TZT*DTTR
 PAR(53)=TIT*DTTR
 PAR(54)=TZT*DTTR
 PAR(55)=RETAC(2)*DTTRP

INIT1090
 INIT1100
 INIT1110
 INIT1120
 INIT1130
 INIT1140
 INIT1150
 INIT1160
 INIT1170
 INIT1180
 INIT1190
 INIT1200
 INIT1210
 INIT1220
 INIT1230
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 INIT1480
 INIT1490
 INIT1500
 INIT1510
 INIT1520
 INIT1530
 INIT1540
 INIT1550
 INIT1560
 INIT1570
 INIT1580
 INIT1590
 INIT1600
 INIT1610
 INIT1620

PAR(56)=ZETATR*OTRR
 PAR(57)=QTR
 PAR(66)=TZTT*OTRR
 PAR(67)=YTT*OTRR
 PAR(68)=TZTT*OTRR
 PAR(58)=PAR(66)-PAR(52)
 PAR(59)=PAR(67)-PAR(53)
 PAR(60)=PAR(68)-PAR(54)
 PAR(61)=VTR
 PAR(62)=PAR(27)*GEARAT
 PAR(63)=QTR*PSD550*GEARAT
 PAR(64)=SETAX(2)*OTRF
 PAR(65)=HUBKTP*OTR
 PAR(69)=DETAN(2)*OTRR
 PAR(70)=HUBKTR*OTR
 PAR(74)=DIST
 PAR(75)=V*FTKTS
 PAR(76)=AYFP*OTRR
 PAR(80)=--PAR(79)
 PAR(81)=VH*FTKTS
 PAR(82)=APFP*OTRR
 PAR(89)=Y(1.89)*OTRR1
 PAR(96)=Y(1.14)*OTRR1
 PAR(103)=COLSTK
 PAR(104)=CYSTK1
 PAR(105)=ALLWG*OTRR
 PAR(106)=ALRWG*OTRR
 PAR(107)=ALEL*OTRR
 PAR(108)=ALFIN*OTRR
 PAR(109)=AY*OTRR
 PAR(110)=CGSTA
 PAR(111)=HGUST
 PAR(112)=--GFWD
 PAR(113)=CYSTK2
 PAR(114)=CLLMG
 PAR(115)=CLRWG
 PAR(116)=CLELE
 PAR(117)=CLFIN
 PAR(118)=AP*OTRR
 PAR(119)=CGBL
 PAR(120)=YGUST
 PAR(121)=GLAT
 PAR(122)=PEDAL
 PAR(123)=COLMG
 PAR(124)=CDRWG
 PAR(125)=CDELE
 PAR(126)=CDFIN
 PAR(127)=CGWL
 PAR(128)=VGUST
 PAR(129)=GVERT
 PAR(130)=TAXR
 PAR(131)=OMRS
 PAR(132)=OMR*PSD550
 PAR(133)=TAXL

INIT1630
 INIT1640
 INIT1650
 INIT1660
 INIT1670
 INIT1680
 INIT1690
 INIT1700
 INIT1710
 INIT1720
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 INIT1800
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 INIT1870
 INIT1880
 INIT1890
 INIT1900
 INIT1910
 INIT1920
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 INIT1940
 INIT1950
 INIT1960
 INIT1970
 INIT1980
 INIT1990
 INIT2000
 INIT2010
 INIT2020
 INIT2030
 INIT2040
 INIT2050
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 INIT2070
 INIT2080
 INIT2090
 INIT2100
 INIT2110
 INIT2120
 INIT2130
 INIT2140
 INIT2150
 INIT2160


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PAR(134)=OMRS*PSD550
PAR(135)=OBRAKE
WRITE (3) IPSN,T,PAR,A,XMB1,XM1,XMBIT,XM1T
TIME, 191 PAR-S, 75 A-S = 267 TOTAL
NTIME=NTIME+1
IF(NTIME-GE.NPRINT) NTIME=0
IF(NTIME-NE.0) RETURN
CALL TIMEX(TUSED,DTIME,TLEFT)
WRITE(6,80) T,TUSED
WRITE (6,81) (HEAD1(J,KONFIG),J=1,2),(PAR(J),J=1,35)
WRITE (6,82) (HEAD1(J,KONFIG+3),J=1,2),(PAR(J),J=36,70)
WRITE(6,83) (PAR(J),J=71,82)
WRITE(6,83) (PAR(J),J=83,102)
WRITE(6,84) (PAR(J),J=103,129)
WRITE(6,85) (PAR(J),J=130,135)
CALL WRFM
WRITE (6,86)
WRITE (6,87) (HEAD1(J,KONFIG),J=1,2),(PAR(J),J=136,163)
WRITE (6,87) (HEAD1(J,KONFIG+3),J=1,2),(PAR(J),J=164,191)
RETURN
80 FORMAT (1H1,10X,F8.3,3X,'SECONDS MANEUVER TIME',10X,
F8.3,3X,'MINUTES ELAPSED COMPUTING TIME',10X,
1L8,FT,DEG,SEC UNITS')
81 FORMAT (1H0,49X,2A4,'ROTOR SHAFT REFERENCE'/
1 28X,'O/A1',6X,'P/B1',37X,'PSI',7X,'BETA',7X,'FORCES'/
2 14X,'VELOCITY ',2F10.3,6X,'U ',F8.3,
3 6X,'ACCEL ',2F10.3,6X,'THRUST ',F10.3/
4 14X,'LOCATION ',2F10.3,6X,'V ',F8.3,
5 6X,'VELOCITY ',2F10.3,6X,'M-FORCE ',F10.3/
6 49X,'W ',F8.3,
7 6X,'LOCATION ',2F10.3,6X,'V-FORCE ',F10.3/
8 7X,'FROM',7X,'COLLEC F/A CYC LAT CYC'/
9 7X,'CONTROLS ',3F8.3,3X,'CONING ',F8.3,
A 3X,'M.TILT ',F9.3,3X,'TOPO ',F9.2,
B 3X,'FLAP LIM',6X,'HUB SPRINGS'/
C 7X,'OTHER ',3F8.3,3X,'IND. V ',F8.3,
D 3X,'RPM ',F9.3,3X,'HP ',F9.2,
E 3X,'UPPER ',F7.3,3X,'F/A ',F8.1/
F 7X,'TOTAL ',3F8.3,57X,'LOWER ',F7.3,
G 3X,'LAT ',F8.1)
82 FORMAT (1H0,58X,'GROUND REFERENCE'/
1 38X,'X',9X,'Y',9X,'Z',24X,'SPEED (KTS) FLT PATH ANGLES'/
2 22X,'VELOCITY ',3F10.3,' DISTANCE ',F8.1,
3 1 AIR ',F7.2,' HEADING ',F8.3/
4 22X,'LOCATION ',3F10.3,' ALTITUDE ',F8.1,
5 1 GND ',F7.2,' CLIMB ',F8.3)
83 FORMAT (1H0,57X,'FUSELAGE REFERENCE'/
1 20X,'U',9X,'V',9X,'W',9X,'P',9X,'Q',9X,'R',
2 7X,'BOBWT',5X,'EULER ANGLES FROM GROUND'/
3 5X,'ACCEL',5X,7F10.3,18X,'PSI',6X,'THETA',6X,'PHI'/
4 5X,'VELOCITY ',7F10.3,3X,'VELOCITY ',3F10.3/
5 88X,'LOCATION ',3F10.3)
84 FORMAT (1H0,6X,'CONTROLS (PCT)'/
1 7X,'COLSTK',5X,F7.2,8X,'L. WING R. WING',

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2 4X,'ELF',4X,'FIN/RUD FUSELAGE',7X,'C.G. LOC (IN)',
3 6X,'GUST (CG) G-S',
4 7X,'F/A CYCSTK ',F7.2,' ATK ',4F9.3,
5 ' ATKY ',F8.3,' STA. LINE ',F7.2,
6 ' FWD ',F5.1,' FWD ',F5.2/
7 7X,'LAT CYCSTK ',F7.2,' CL ',4F9.3,
8 ' ATKP ',F8.3,' B. LINE ',F7.2,
9 ' LAT ',F5.1,' LAT ',F5.2/
10 7X,'PEDAL',6X,F7.2,' CD ',4F9.3,'17X,'W. LINE ',F7.2,
11 ' VERT ',F5.1,' VERT ',F5.2)
12 R FORMAT (1H0,34X,'JET THRUST',13X,'ENGINE',/
13 35X,'RIGHT/CENTER ',F8.1,' TORQUE ',
14 F9.1,' TOTAL HP RQD ',6X,F8.1/
15 35X,'LEFT',6X,F8.1,' SHAFT HP ',F9.1,
16 ' ROTOR BRAKE TORQUE ',F8.1)
17 R6 FORMAT (1H1)
18 R7 FORMAT (1H0,59X,2A4,'ROTOR',/
19 48X,'BLADE 1 BLADE 2 BLADE 3 BLADE 4 BLADE 5',
20 3X,'BLADE 6 BLADE 7',/
21 18X,'AZIMUTH LOCATION ',7F10.3/
22 18X,'FLAPPING ACCEL WRT MAST ',7F10.3/
23 18X,'FLAPPING VELOCITY WRT MAST ',7F10.3/
24 18X,'FLAPPING LOCATION WRT MAST ',7F10.3)
25 END
INIT2710
INIT2720
INIT2730
INIT2740
INIT2750
INIT2760
INIT2770
INIT2780
INIT2790
INIT2800
INIT2810
INIT2820
INIT2830
INIT2840
INIT2850
INIT2860
INIT2870
INIT2880
INIT2890
INIT2900
INIT2910
INIT2920
INIT2930
INIT2940

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SUBROUTINE INRO (ZETAR,BH,BAIB,XMR,Q,B,N)
COMMON /STRIAB/ D(21),DT(21),E(79),F(10),X(10),
1 DL,DM,DN,DX,DY,DZ,IX,IY,IZ,PD(10,11),
2 DTR,EPD,ERR(10),KMI,RHO,
3 R12,SPD(6,3),XBW(21),XEL(14),
4 XER(7),XFC(28),XFN(7),XFS(35),
5 XGN(7),XIT(21),XRM(49),XTR(49),
XMR MUST HAVE ITS NAME CHANGED HERE TO AVOID CONFLICT
WITH ARGUMENT
6 XWG(21),YMR(21),YTR(21),YWG(21),
7 YEL(21),YFN(21),BLCG,DAMP,DEPD(10),
8 EPDS,EPDX(10),MASS,OSV1,TMRS,TTRS,
9 WLCG,XCON(63),XJET(14),XMIN,AYEFP,
A BETAES(2),CNPCD,DHADO,DYBDR,GUESS,
B NPASS,PDPH(10,11),STACG,TZERD,
C XMAST,DHADA0,DODCOL,DTRRSO,DYBDR,
D ENGRPM,4XPASS,PSO3OP,TRIND1,XLIMIT
COMMON /STAMAN/ HL(2),XX,YY,AY1,GOV,KPD,QPC,000,
1 RIY,APBG,ARBG,ASEP,AYBG,BWTC,
2 RC,BWTK,BWTM,CG8L,DPIX,DPIZ,
3 FHPT(2),R550,ALERT,AYDMX,DELT2,
4 OPIXZ,DTBWT,DWLCG,MOELT,HGUST,
5 HLTR1,HLTR2,ITORS,KTCR,DMEGM,
6 PCDEL,QMRS,AMASS,TRALT,TMOPI,VGUST,
7 ISTOP,XAGUN,XAPYL,XARSP(2),YAGUN,
8 VARSP(2),YGUST,ZAGUN,ZAPYL,ZARSP(2),
9 DELT2R,DSTACG,E'MAST,GPRELD,HLPLYD,
A IBRAKE,DMEGMO,OBRAKE,BETAZS(2),
B PCGOED,PCGMAX,PCRATE,PO1DTR,ROELT1,
C ROELT2,RITORS,TRINDZ
COMMON /ROMAN/ ZZ,VXS(2),VVS(2),VVS(2),BETA(12,2),
1 T,PCC(2),COSE(7,7,2),BETAN(2),BETAX(2),BETAZ(2),
2 AIB(2),APDD,ARDO,AYDD,AIR(2),
3 DPSI(12,2),DTRR,NPSI(2),ZZTR,
4 BETA0(12,2),BNPSI(2),
5 CONO2,GMAXV,RATE1,RATE2,STDP2,
6 THROT(2),TRIND,XGUST,BETAZD(2),GMAXV1,
7 GMAXV2,GMAXV3,GUSTYP,HNPISR(2),
8 HUBKPS,HUBKRS,HUBTPS,HUBTRS,
9 KONFIG,LNGTH1,PILGHI,PSIREF(2),
A START2,XMOMLI(12,2),
B R(2),OR(2),TI(2),
C T2(2),TZR(2),XMA(2),
D XMB(2),AIBP(2),AIBR(2),
E APDR(2),ARDR(2),PSIO(2),
F XSTAH(2),YSTAH(2),
G HUBKPR(2),HUBKRP(2),
H AZETAR(2),VZETAR(2)
COMMON /ROSTAR/ AM(2),CT,P1,XB(2),ALT,AOR(2),EXH(2),
1 NXR(2),RBH(2),SWC(2),UHS,CDB(2),LROT(2),
2 RATB(2),RTRP(2),TAIR(14),CONEK(2),OCAFR(2),FVIND,
3 NVARD,
4 SWKR1(2),SWKR2(2),TIP18(2),TIP38(2),
5 TWIST(20,2),CLRADK(2),DELTA3(2),

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INR00010
INR00020
INR00030
INR00040
INR00050
INR00060
INR00070
INR00080
INR00090
INR00100
INR00110
INR00120
INR00130
INR00140
INR00150
INR00160
INR00170
INR00180
INR00190
INR00200
INR00210
INR00220
INR00230
INR00240
INR00250
INR00260
INR00270
INR00280
INR00290
INR00300
INR00310
INR00320
INR00330
INR00340
INR00350
INR00360
INR00370
INR00380
INR00390
INR00400
INR00410
INR00420
INR00430
INR00440
INR00450
INR00460
INR00470
INR00480
INR00490
INR00500
INR00510
INR00520
INR00530
INR00540

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5      LAMBDA(2),UPGUST,URGUST,UTGUST,WRDTDR,
6      ER(2),ERX(2),
7      XLIMAX(2),XLIMIN(2)
      DIMENSION XMR(49),HUBKS(2,2),ZETAR(2),BM(2),BATB(2),B(2)
1      ,DROT(21,2)
      EQUIVALENCE (HUBKS(1,1),HUBKPS),(DROT(1,1),O(1))
      VXS(N)=0.
      VYS(N)=0.
      VZS(N)=0.
      LROT(N)=0.
      ARDR(N)=0.
      APDR(N)=0.
      AIBP(N)=0.
      AIBR(N)=0.
      BETAZ = INPUT PRE-CONE ANGLE
      BETAE = DEFLECTION FROM BETAZ DUE TO BLADE BENDING
      BETAO = CONING ANGLE = BETAZ + BETAE
      AZEJAR(N)=0.
      BETAZD(N)=0.
      VZETAR(N)=0.
      PSIREF(N)=0.
      B(N)=XMR(1)
      NXR(N)=XMR(2)
      NPSI(N)=12
      R(N)=XMR(4)
      IF(R(N).NE.0.) GO TO 12
      R(N)=1.
      S(N)=0.
12  CONTINUE
      C=XMR(5)*R12
      CONEK(N) = XMR(6)*DTRR
      BETAN(N)=XMR(7)*DTR
      XARSP(N)=STACG-XMR(8)*R12
      YARSP(N)=XMR(9)*R12-BLCG
      ZARSP(N)=WLCG-XMR(10)*R12
      ZETAR(N)=XMR(11)*DTR
      HL(N)=XMR(12)
      FHPT(N)=XMR(16)
      HUBKPR(N)=XMR(17)*DTRR
      HUBKRR(N)=XMR(18)*DTRR
      SWKR1(N)=XMR(19)*DTR
      EXH(N)=XMR(21)
      BETAZ(N)=XMR(22)*DTR
      PCC(N)=XMR(23)
      IF(N.EQ.2) PCC(N)=XMR(23)*TRIND
      DELTA3(N)=TAN(XMR(24)*DTR)
      CMB(N)=XMR(25)
      CLRADK(N)=XMR(26)*TWOP/C/(57.3*(C+4.*R(N)))
      DC4FR(N)=XMR(27)
      NRAD = NXR(N)
      DO 11 I=1,NRAD
      TWIST(I,N)=-XMR(11+20)*DTR
11  CONTINUE
      SWKR2(N)=SWKR1(N)

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INR00550
INR00560
INR00570
INR00580
INR00590
INR00600
INR00610
INR00620
INR00630
INR00640
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INR00660
INR00670
INR00680
INR00690
INR00700
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INR00720
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INR00940
INR00950
INR00960
INR00970
INR00980
INR00990
INR01000
INR01010
INR01020
INR01030
INR01040
INR01050
INR01060
INR01070
INR01080

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CR(N)=PSID(N)*R(N)
BETAZ(N)=BETAZ(N)
BETAX(N)=2.*BETAZ(N)-BETAN(N)
RTRP(N)=1./((TWOPI*RMOR(N)**2)
XB(N)=-.05
IF(NRAD.NE.0) XB(N)=1./NRAD
TIPIR(N)=.125-.00625*NRAD
TIP3B(N)=3.*TIPIR(N)
AOR(N)=(FXH(N)/R(N))**2
BH(N)=.5*B(N)
IF(XMR(16).NE.0.) XMR(15)=XMR(16)
IH=20.*XMR(15)/R(N)
RHO=R(N)**2
HNPST=2.*QCOR(N)*XB(N)
R10=.015*RSQ
R10 = IN * FT
R09=-.2330821E-04*RSQOR(N)
R09 = IN * FT * SEC**2
DO=OROT(21.N)/R(N)
AIB(N)=1307.511*DO
CFX=2.052239*DO
RI=0.
RIWK=0.
K=21
RO=20.75
DO 57 I=1,20
K=K-1
RO=RO-1.
POMK=RO*OROT(K,N)
CFX=CFX+RIWK+ROWK
AIB(N)=AIB(N)+RO*ROWK+RI*RIWK
RI=RO-.5
RIWK=RI*OROT(K,N)
IF(K.EQ.IH) GO TO 58
57 CONTINUE
58 CONTINUE
AM(N)=CFX*R10
AIB(N)=AIB(N)*R09
BAIB(N)=B(N)*AIB(N)
AIR(N)=BH(N)*AIB(N)
IF(B(N).LE.2.) A(R(N) =2.*AIB(N)
RBH(N)=0.
(F(BH(N).NE.0.) RBH(N)=AIR(N)/BH(N)
RAIB(N)=0.
IF(AIR(N).NE.0.) RAIB(N)=1./A(R(N)
ECE=FHPT(N)*AM(N)/32.16
CALL NOPSTO (HNPST,BH,N)
ECEI=ECE*RAIB(N)
HUBKS(1,N)=ECEI
HUBKS(2,N)=ECEI
IF(FHPT(N).EQ.0.) GO TO 48
BETAZ(N)=0.
HUBKPS(N)=ECE*PSID(N)**2
HUBKPR(N)=HUBKPR(N)

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INR0109C
INR01100
INR01110
INR01120
INR01130
INR01140
INR01150
INR01160
INR01170
INR01180
INR01190
INR01200
INR01210
INR01220
INR01230
INR01240
INR01250
INR01260
INR01270
INR01280
INR01290
INR01300
INR01310
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INR01390
INR01400
INR01410
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INR01480
INR01490
INR01500
INR01510
INR01520
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INR01570
INR01580
INR01590
INR01600
INR01610
INR01620

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INR01630
 INR01640
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 INR01690
 INR01700
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 INR01720
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 INR01740
 INR01750
 INR01760
 INR01770
 INR01780
 INR01790
 INR01800
 INR01810

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48 CONTINUE
  IF(B(N).EQ.0.) RETURN
  NPSIN=8(N)
  DO 10 I=1,NPSIN
    COSE(I,I,N)=1.
    IF(I.EQ.NPSIN) GO TO 10
    I1=I+1
    DO 9 K=I1,NPSIN
      IF(ECE.NF.0.) GO TO 8
      COSE(I,K,N)=DCOS(6.283185307D00/NPSIN*(I-K))
      COSE(K,I,N)=COSE(I,K,N)
    GO TO 9
  8 CONTINUE
    COSE(I,K,N)=0.
    COSE(K,I,N)=0.
  9 CONTINUE
  10 CONTINUE
    RETURN
  END

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SUBROUTINE ITRI4(LPASS)
COMMON /STRIAB/ D(21),DT(21),EIT91,F(10),X(10),
1 DL,DM,DN,DX,DY,DZ,IX,IY,IZ,PD(10,11),
2 DTR,EPD,ERR(10),KML,RHO,
3 R12,SPD16,6,3),XBW121),XEL(14),
4 XER(7),XFC128),XFN(7),XFS(35),
5 XGN(7),XIT121),XMR(49),XTRI49),
6 XWG(21),YMR(21),YTR(21),YMG121),
7 YFL(21),YFNI21),BLCG,DAMP,DEPD(10),
8 EPDS,EPDX(10),MASS,QSV1,TMR,TTTS,
9 WLCG,XCON163),XJET(14),XMIN,AYEFP,
A 9ETAES(2),CNPCD,DHADDQ,DYBDR,GUESS,
B VPASS,DPHI(10,11),STACG,YZERO,
C XMAST,DHADAQ,DODCOL,OTRSQ,DYBDR,
D ENGRPM,MXPASS,PSD30P,TRIND1,XLIMIT
COMMON /MANAL/
1 TZT,T1T,T2T,ALEL,CZFT,PSDD,
2 SZFT,TAXL,TAXR,XAWG,XLNK116),ZAWG,
3 ALCYP,ALFIN,ALLWG,ALRWG,CDELE,CDFIN,
4 CLWG,CORWG,CLELF,CLFIN,CLLWG,CLRWG,CWING,
5 CYCR1,CYCR2,CZET4,CZET6,CZET9,RANGE,
6 SZETS,SZFT7,SZFT8,MGCOL,XAFLE,XAFIN,
7 XAFUS,XAJET,YAFIN,ZAELE,ZAFIN,ZAFUS,
8 YAELE,YAFUS,YALWG,YARWG,YALJET,YARJET,
9 ZAJET,ALECR1,ALCFPD,BOTTOM,CZET11,
A CZFT12,CZET13,EIZFTA,HALFPI,SZET10,
B XAPYLO,YGUSTW,ZAPYLD,ZFLWGI,ZFRWGI,
C TZMS,TIMS,T2MS,TZTS,T1TS,T2TS,
D CLOCK,FLCK,XLOCK,TCLOCK
COMMON /MANARO/ (V,IND,NWAG,APBMT,ARBMT,AYBMT,BETA0(2),TDELT,
1 3ETA(2),HGUSTE,HGUSTF,HGUSTW,VGUSTE,
2 VGUSTW,VGUSTF,GFWD,GLAT,GVERT,
3 VXB,VZB,APD,VYR,ARD,AYD,
4 COLSTK,CYSTK1,CYSTX2,PEDAL,AYE,
5 APE,ARE,ALM,BIM,ALTR,BLTR,
6 XAR(2),YAR(2),ZAR(2),
7 VIMP,VITR,ZETA,ZETATR,HMR,HTR,
8 TMR,ITR,OMX,QTR,YMRF,YTRF
COMMON /STANRO/ J,W,ITM,VHS(2),LINK,QELE,VROT(2),
1 VSND,YFIN(2),ZFEL(2),AIBAL12),
2 BIBAL(2),CONDI,SWING,PILGHZ,PMGEL1,
3 BM,BTR,PMOMM,PMOMT,RMOMM,RMOMT
COMMON /TOPLOT/ AH(3),AL(3),EXIT,ICOM149),IPSN,
1 NPART,NVARA,NVARR,NVARC,NSCALE
2 NVAR,NPRINT,NTIME
COMMON /FORY/ Y(4,150)
DIMENSION VAR(11)
EQUIVALENCE (VAR11),COLSTK)
KOUNT=11
IF(ISTR.FO.O.) KOUNT=9
IF(IBM.FO.O.) KOUNT=7
IF(XFC(23).NE.O.) KOUNT=7
IF(ITM.NE.O.) KOUNT=7
KMI=KOUNT-1
ITRI0010
ITRI0020
ITRI0030
ITRI0040
ITRI0050
ITRI0060
ITRI0070
ITRI0080
ITRI0090
ITRI0100
ITRI0110
ITRI0120
ITRI0130
ITRI0140
ITRI0150
ITRI0160
ITRI0170
ITRI0180
ITRI0190
ITRI0200
ITRI0210
ITRI0220
ITRI0230
ITRI0240
ITRI0250
ITRI0260
ITRI0270
ITRI0280
ITRI0290
ITRI0300
ITRI0310
ITRI0320
ITRI0330
ITRI0340
ITRI0350
ITRI0360
ITRI0370
ITRI0380
ITRI0390
ITRI0400
ITRI0410
ITRI0420
ITRI0430
ITRI0440
ITRI0450
ITRI0460
ITRI0470
ITRI0480
ITRI0490
ITRI0500
ITRI0510
ITRI0520
ITRI0530
ITRI0540

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NPASS=C
KPASS=-1
CALL TIMEK (TUSED,DTIME,TLEFT)
5 NPASS=NPASS+1
KPASS=KPASS+1
IF(KPASS.EQ.LPASS) KPASS=0
IF(COND1.NE.0.) WRITE (6,210) NPASS
J=1
BETA(1)=BETAES(1)
BETA(2)=BETAES(2)
TMR=TMRS
TTR=TTTRS
CALL AJACOB
IF(EXIT.NE.0.) GO TO 61
BETA(1)=BETA(1)
BETA(2)=BETA(2)
TMR=TMRS
TTR=TTTRS
DO 40 K=1,KM1
40 PD(K,KOUNT)=-F(K)
DO 71 K=1,KM1
71 IF(ABS(F(K)).GT.DAMP) GO TO 72
CALL DAMPER
72 CONTINUE
DO 73 K=1,KM1
73 IF(ABS(F(K)).GT.ERR(K)) GO TO 75
GO TO 170
75 CONTINUE
IF(KPASS.GT.0) GO TO 56
J=2
CALL JACOB1
IF(EXIT.NE.0.) GO TO 61
IF(KOUNT.EQ.7)
1 CALL RATS (Y(1,90),Y(1,91),Y(1,92),AYE,APE,VXB,VYB,VZ8,-1)
IF(KOUNT.EQ.11) CALL PD2(PD,AYEFP)
IF(COND1.NE.0.) CALL WRVP (2,VAP,KM1,PD,TAXL,TAXR)
DO 47 I=1,KM1
PD(I,10)=-PD(I,10)
47 CONTINUE
56 CONTINUE
DO 48 J=1,KOUNT
DO 48 I=1,KM1
48 PDPHI(I,J)=PD(I,J)
CALL SOLVE
IF(EXIT.NE.0.) GO TO 10
CALL RATIO(X,EPDX,XLIMIT,VAR)
DO 86 I=6,11
IF(ABS(IVAR(I)).GT.HALFPI) GO TO 61
86 CONTINUE
IF(NPASS.LT.MXPASS)GO TO 5
61 EXIT=1.
170 CONTINUE

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ITRI0550
ITRI0560
ITRI0570
ITRI0580
ITRI0590
ITRI0600
ITRI0610
ITRI0620
ITRI0630
ITRI0640
ITRI0650
ITRI0660
ITRI0670
ITRI0680
ITRI0690
ITRI0700
ITRI0710
ITRI0720
ITRI0730
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ITRI0930
ITRI0940
ITRI0950
ITRI0960
ITRI0970
ITRI0980
ITRI0990
ITRI1000
ITRI1010
ITRI1020
ITRI1030
ITRI1040
ITRI1050
ITRI1060
ITRI1070
ITRI1080

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CALL PAPA (W,COND1)
RETURN
10 CONTINUE
WRITE (6,11)
RETURN
11 FORMAT (1H0,'THE PARTIAL DERIVATIVE MATRIX IS SINGULAR.'/
1      1      , THIS IS PROBABLY CAUSED BY ONE OF THE CONTROLS BEING
2UNCONNECTED.')
210 FORMAT (1H1/1H ,50X,'***** START OF ITERATION '13,' *****')
FND

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ITR11090
ITR11100
ITR11110
ITR11120
ITR11130
ITR11140
ITR11150
ITR11160
ITR11170
ITR11180

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1	COMMON /ANDOTIT/	AL,RI,XK,XY,VI?,VI4,APDM,APFM,ARDM,ARFM,	ITR00010
2		AYFM,ROTIJ,XK43,XLIM,CBFAC,	ITR00020
3		GOISK(12),NOPSI,TANAI,TANB1,	ITR00030
4		TANT1,TNT2,DCAFXX,IPRINT,NORADL,	ITR00040
5		SHEARL(12),SHEARO(12),SHEARR(12),	ITR00050
6		XMOML(12),XMOMO(12)	ITR00060
7			ITR00070
8	COMMON /ROMAN/	APOS,AROS,PFAC,RFAC,AP0BS,AR0BS	ITR00080
9		ZZ,VXS(2),VYS(2),VZS(2),BETA(12,2),	ITR00090
10	*	T,PCC(2),COSE(7,7,2),BETAN(2),BETAX(2),RETAX(2),	ITR00100
11	*	AI(2),APDO,ARDO,AYDO,AIR(2),	ITR00110
12	1	DPSI(12,2),DIIR,NPSI(2),ZZTR,	ITR00120
13	2	BETAD(12,2),BNPSI(2),	ITR00130
14	3	CONO?,GMAXV,RATE1,RATE2,STOP?,	ITR00140
15	4	THROT(2),TRIND,XGUST,BETAZD(2),GMAXV1,	ITR00150
16	5	GMAXV2,GMAXV3,GUSTYP,HNPSI(2),	ITR00160
17	6	HURKPS,HURKRS,HURTPS,HURTRS,	ITR00170
18	7	KONFIG,LNGTH1,PILGH1,PSIREF(2),	ITR00180
19	8	START2,XMOMLI(12,2),	ITR00190
20	9	R(2),GR(2),TI(2),	ITR00200
21	A	T2(2),TZR(2),XMA(2),	ITR00210
22	B	XMB(2),AIBP(2),AIBR(2),	ITR00220
23	C	APDR(2),ARDR(2),PSID(2),	ITR00230
24	D	XSTAH(2),YSTAH(2),	ITR00240
25	E	HUBKPR(2),HURKRR(2)	ITR00250
26	F	AZETAR(2),VZETAR(2)	ITR00260
27	COMMON /MANAROT/	I,V,IND,NWAG,APRMT,ARBMT,AYBMT,BEYAD(2),TOELT,	ITR00270
28	1	BETAF(2),HGUSTE,HGUSTF,HGUSTW,VGUSTE,	ITR00280
29	2	VGUSTW,YGUSTF,GFWD,GLAT,GVERT,	ITR00290
30	3	VXB,VZB,APD,VYR,ARD,AYO-	ITR00300
31	4	COLSYK,CYSTKI,CYSTK?,PEDAL,AYE,	ITR00310
32	5	APE,ARE,AIM,BIM,AIR,BIYR,	ITR00320
33	6	XAR(2),YAR(2),ZAR(2),	ITR00330
34	7	VIR(2),ZETAR(2),WFORCE(2),	ITR00340
35	8	THRUST(2),TORQUE(2),YFORCE(2)	ITR00350
36	COMMON /STANR- /	J,W,ITH,VHS(2),LINK,QUELE,VPOT(2),	ITR00360
37	1	VSND,YFIN(2),ZFEL(2),AIBAL(2),	ITR00370
38	2	RIBAL(2),CONDI,SWING,PILGH2,PMGELL,	ITR00380
39	3	R(2),PMOM(2),RMOM(2)	ITR00390
40	COMMON /ROSTAP/	AM(2),CT,PI,XR(2),ALT,ADR(2),EXH(2),	ITR00400
41	1	NXRI(2),RBH(2),SWC(2),UHS,CDHB(2),LR0T(2),	ITR00410
42	2	RAIB(2),RTRPI(2),TAIR(14),CONFK(2),DCAFR(2),FVIND,	ITR00420
43	*	NVARO,	ITR00430
44	3	SMKRI(2),SMKR2(2),TIPIR(2),TIP38(2),	ITR00440
45	4	TWIST(20,2),CLRADK(2),DELTA3(2),	ITR00450
46	5	LAMBDA(2),UPGUST,URGUST,UTGUST,WRDOR,	ITR00460
47	6	ER(2),ERX(2),	ITR00470
48	7	XLIMAX(2),XLIMIN(2)	ITR00480
49	COMMON /TOPLOT/	AH(3),AL(3),EXIT,ICOM(49),IPSN,	ITR00490
50	1	NPART,NVARA,NVARR,NVARC,NSCALE	ITR00500
51	2	,NVARO,NPRINT,NTIME	ITR00510
52	3	REAL LAMBDA	ITR00520
53	4	DIMENSION AA(12,5),HEAD(2),HEAD1(11,2),HEAD2(4,5)	ITR00530
54	5	EQUIVALENCE (AA(1,1),SHEARL(1))	ITR00540

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DATA HEAD/ 4HMAIN,4HTAIL/
DATA HEAD1/ ROTOR FLAP CORRECTION EXCEEDS 90 DEGREES ROTOR BAL
LANCE EXCEEDS ALLOWABLE ERROR
DATA HEAD2/ AIRLOAD LIFT AIRLOAD DRAG RADIAL DRAG FLAPP
TING MOMENT INPLANE MOMENT
IF(BETAX(N).EQ.BETAN(N)) ITM=0
KBAL=C
TZRN=TZR(N)
VITER=0
287 KK=2
  IF(ITM.NE.0) GO TO 21
  IF((EQ.2.AND.LINK.EQ.4) GO TO 21
  IF(J.EQ.1.AND.LINK.EQ.2) GO TO 21
  KK=0
  GO TO 288
22 KK=KK-1
21 CONTINUE
  VIRS=VIR(N)
  VIR(N)=0
  LAMDA(N)=VZS(N)
  IF(THRUST(N).EQ.0--OR.OR(N).EQ.0-) GO TO 289
  CT=THRUST(N)*TRP(N)
  CALL VIND (N,EXIT)
  IF(EXIT.NE.0) RETURN
289 CONTINUE
  DVIR=VIR(N)-VIRS
  IF(ABS(DVIR)-GT.FVIND) VIR(N)=VIR(N)+SIGN(FVIND,DVIR)
  VIR(N) = .5*(VIR(N) + VIRS)
288 CONTINUE
  XY=SQRT(V(4+VIR(N)**2))-VIZ
  YV=SQRT(AMAX1(0.,XY))*OCAFXK*VIR(N)
  ITER=-1
15 VITER=VITER+1
  ITER=ITER+1
  IF(ITER.FQ.4) ITER=0
  IF(ITM.EQ.0) GO TO 204
  NDA1=0
  IF(XL(M.LT.XLIM(N(N)) XLIM=XLIMIN(N)
  EPDD=.5*XLIM
  FPDDR=1./EPDD
  GO TO 25
204 NDA1=3
25 NDA1=NDA1+1
  IF(LINK.EQ.4) GO TO 26
  TANAL=TAN(A1)
  TANB1=TAN(B1)
  COSB1=COS(B1)
  PFAC=APDBS/((COS(A1)**2+COSB1)*PSID(N)*TANB1
  RFAC=ARDBS/COSB1**2-PSID(N)*TANAL
  IF(LINK.EQ.3) GO TO 26
  BETAO(N)=BETAZ(N)+BETAE(N)
  TZR(N)=TZR+BETAE(N)*PCC(N)
26 CONTINUE
  XMA(N)=0.

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ITR00550
ITR00560
ITR00570
ITR00580
ITR00590
ITR00600
ITR00610
ITR00620
ITR00630
ITR00640
ITR00650
ITR00660
ITR00670
ITR00680
ITR00690
ITR00700
ITR00710
ITR00720
ITR00730
ITR00740
ITR00750
ITR00760
ITR00770
ITR00780
ITR00790
ITR00800
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ITR00830
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ITR00870
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ITR00920
ITR00930
ITR00940
ITR00950
ITR00960
ITR00970
ITR00980
ITR00990
ITR01000
ITR01010
ITR01020
ITR01030
ITR01040
ITR01050
ITR01060
ITR01070
ITR01080

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XMB(N)=0.
PMOM(N)=0.
RMOM(N)=0.
THRUST(N)=0.
TORQUE(N)=0.
HFORCE(N)=0.
VFORCE(N)=0.
CALL DOROT(N)
IF(EXIT.NE.0.) RETURN
THRUST(N)=THRUST(N)*BNPSI(N)
TORQUE(N)=TORQUE(N)*BNPSI(N)
HFORCE(N)=HFORCE(N)*BNPSI(N)
VFORCE(N)=VFORCE(N)*BNPSI(N)
XMA(N)=XMA(N)-ATBP(N)
XMB(N)=XMB(N)+ATBP(N)
IF(COND2.EQ.C.) GO TO 67
DO 59 K=1,12
DO 58 L=1,5
IF(L.EQ.4) GO TO 58
AA(K,L)=AA(K,L)*BNPSI(N)
58 CONTINUE
59 CONTINUE
WRITE (6,106) ((HEAD2(M,K),M=1,4),((AA(M,K),M=1,12),K=1,5)
60 CONTINUE
IF(COND1.LT.1.5) GO TO 67
ALDEG=AL*DTTR
SIDEG=BI*DTTR
WRITE (6,104) N,NOAL,ALDEG,BIDEG,XMA(N),XMB(N)
1 PMOM(N),RMOM(N),ATBP(N),ATBR(N)
67 GO TO (64,61,62,1),NOAL
64 BASEA=XMA(N)
BASEB=XMB(N)
IF(ABS(XMA(N))-LE.ERX(N).AND.ARS)XMB(N))-LE.FRX(N)) XLTM=EPDD
IF(ABS(XMA(N))-GT.ER(N)) GO TO 66
IF(ABS(XMB(N))-GT.ER(N)) GO TO 66
KBAL=1
GO TO 1
66 CONTINUE
IF(ITER.GT.0) GO TO 68
AI=AI+EPDD
GO TO 25
61 AI=AI-EPDD
PDAA=(XMA(N)-BASEA)*EPDDR
PDBA=(XMB(N)-BASEB)*EPDDR
GO TO 25
62 BI=BI-EPDD
PDAB=(XMA(N)-BASEA)*EPDDR
PDBB=(XMB(N)-BASEB)*EPDDR
DENOM=PDAA*PDAB-PDAB*PDAA
68 CONTINUE
XNA=BASEB*PDAB-BASEA*PDBB
XNB=BASEA*PDAB-BASEB*PDAA
A=999.

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ITR01000
ITR01100
ITR01110
ITR01120
ITR01130
ITR01140
ITR01150
ITR01160
ITR01170
ITR01180
ITR01190
ITR01200
ITR01210
ITR01220
ITR01230
ITR01240
ITR01250
ITR01260
ITR01270
ITR01280
ITR01290
ITR01300
ITR01310
ITR01320
ITR01330
ITR01340
ITR01350
ITR01360
ITR01370
ITR01380
ITR01390
ITR01400
ITR01410
ITR01420
ITR01430
ITR01440
ITR01450
ITR01460
ITR01470
ITR01480
ITR01490
ITR01500
ITR01510
ITR01520
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ITR01540
ITR01550
ITR01560
ITR01570
ITR01580
ITR01590
ITR01600
ITR01610
ITR01620

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IF(DENOM.EQ.0.) GO TO 70
DA1=XNA/DENOM
DB1=XNB/DENOM
IF(CONDI.GE.1.51) WRITE 16,1751 PDAA,PDBA,PDA8,PD5B,DEMOM,XNA,XNB,
1 DA1,DB1,EPDD,XLIM
63 A=ARS(DA1)
BB=ABS(DB1)
IF(A.LT.XLIM.AND.BB.LT.XLIM) GO TO 65
IF(A.GT.PI.OR.BB.GT.PI) GO TO 70
CA=DA1*.5
DB1=DB1*.5
GO TO 63
65 A1=A1+DA1
B1=B1+DB1
KK=2
IF(NITER.LT.ITM) GO TO 15
IF(KRAL.EQ.01) GO TO 70
KBAL=2
NDA1=3
GO TO 25
70 JJ=1
IF(A.LT.XLIM.AND.BB.LT.XLIM) JJ=2
WRITE 16,1011 HEAD(N),(HEAD11,J,J1,J=1,11)
EXIT=1.
RETURN
1 IF(KBAL.NE.2) GO TO 4
K=J-1
WRITE 16,102) K
GO TO 3
4 CONTINUE
IF(KK.EQ.0) GO TO 2
IF(LINK.LT.41) GO TO 22
2 IF(ITM.EQ.0) GO TO 3
IF(ABS(XNA(N)).GT.ER(N).OR.ABS(XNB(N)).GT.ER(N)) GO TO 237
3 CONTINUE
YZRN)=YZRN
RETURN
101 FORMAT (1H0,12A4)
102 FORMAT (1'WARNING. THE PARTIAL DERIVATIVE MATRIX MAY BE IN ERROR')
104 FORMAT (1H0,215,6G15.7/(11X,6G15.7))
105 FORMAT (1H0,8G15.7)
106 FORMAT (1H0,57X,4A4//6E20.5/6E20.5)
END
ITR01610
ITR01640
ITR01650
ITR01660
ITR01670
ITR01680
ITR01690
ITR01700
ITR01710
ITR01720
ITR01730
ITR01740
ITR01750
ITR01760
ITR01770
ITR01780
ITR01790
ITR01800
ITR01810
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ITR01880
ITR01890
ITR01900
ITR01910
ITR01920
ITR01930
ITR01940
ITR01950
ITR01960
ITR01970
ITR01980
ITR01990
ITR02000
ITR02010
ITR02020
ITR02030
ITR02040
ITR02050

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SUBROUTINE IVAP (EXIT, LINK, TAXL, TAXR, PDLGM2, ALM, AIM, AITR, RITR)
COMMON /STRIMA/ AY, VH, AGM, DT1(2), DT2(2), IXZ,
  1 QMR, XDO, VYD, ZZD, ALGF, APFP, AYFP,
  2 CGL, COLL(6), CYCF(4), CYCL(3),
  3 DIST, KCIT(20), PED(3), QMAX,
  4 QMS, TIME, IMAX, XCIT(20,6), ALGEZ,
  5 ALGE1, ALGE2, CGSTA, CPMIC, DIXI2,
  6 DIVIX, DTZTY, DTZMT, DTZMI, DTZTI, FTKTS,
  7 HURKM(2,2), HURKI(2,2),
  8 KPFAD, PIU30, TSTAR(14), ZMAX2, ZMAX3,
  9 ASECOL, CYPWIC, GEARAT, PSD55,
  10 PSTSTP, QX9RAK, PUOTND, ZDELTI, ZDELTY
  11 ZZ, VXS(2), VYS(2), VZS(2), BETA(12,2),
  12 T, PCC(2), COSF(7,7,2), RETAN(2), RETAX(2), RETAZ(2),
  13 AIR(2), APDD, APDQ, AYD3, AIR(2),
  14 DPSI(12,2), DTPR, MPSI(2), ZITH,
  15 RETAD(12,2), BNPST(2),
  16 CONQ2, GMAXV, RATE1, RATE2, STOP2,
  17 THROT(2), TRIND, XGUST, RETAZD(2), GMAXV1,
  18 GMAXV2, GMAXV3, GUSTYP, HNPSP(2),
  19 HURKPS, HURKRS, HURTPS, HURTRS,
  20 KNETS, LNGTH1, PII, GHI, PSTREF(2),
  21 STAPT2, XWOMLI(12,2),
  22 GW, PTR, ORW, PTR, TIMI, TITI,
  23 T2MT, T2TT, T2MT, T2TT, XMA), XMAIT,
  24 XMA1, XMAIT, AIPPM, AIPPT, AIBRM, AIBRT,
  25 APTD, APTD, ACTD, APTD, PSD, PSDT,
  26 XSTAHM, XSTAHM, YSTAHM, YSTANT,
  27 HURKP, HURKTP, HURKR, HURKTR
  28 *AZETA, AZETA, VZETA, VZETAT
  29 DATA DTP, MALFPI, PI, TWOP / .174529E-03, 1.570796, 3., 1.41593, 6., 2.01145/
  30 IFAL LNGTH1, LNGTH2
  31 DIMENSION HURK(2,2), TAX(2), PSTD(2)
  32 EQUIVALENCE (HURK(1,1), HURKPI), (PSTD(1), PSD)
  33 XDF1, MX1, X2, X3 = AMAX1(X1, AMIN1(X2, X3))
  34 TAX(1) = TAXL
  35 TAX(2) = TAXR
  36 GO TO 1 = 1, KREAD
  37 J = KCIT(1)
  38 IF (J, L, 1, OR, J, GT, 31) GO TO 2013
  39 IF (LINK, EQ, 1) GO TO 21
  40 IF (J, EQ, 13) GO TO 209
  41 IF (J, EQ, 14) GO TO 210
  42 IF (J, EQ, 21) GO TO 219
  43 IF (J, EQ, 22) GO TO 219
  44 GO TO 220
  45 CONTINUE
  46 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  47 IF (J, GT, 8) GO TO 221
  48 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  49 231 CA = 100 / COLL(1)
  50 GO TO 239
  51 232 CA = 100 / CYCF(1)
  52 GO TO 239
  53 233 CA = 100 / CYCF(1)
  54 GO TO 239
  55 201 CONTINUE
  56 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  57 21 IF (LINK, EQ, 1) GO TO 21
  58 209 IF (J, EQ, 13) GO TO 209
  59 210 IF (J, EQ, 14) GO TO 210
  60 219 IF (J, EQ, 21) GO TO 219
  61 219 IF (J, EQ, 22) GO TO 219
  62 GO TO 220
  63 CONTINUE
  64 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  65 IF (J, GT, 8) GO TO 221
  66 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  67 231 CA = 100 / COLL(1)
  68 GO TO 239
  69 232 CA = 100 / CYCF(1)
  70 GO TO 239
  71 233 CA = 100 / CYCF(1)
  72 GO TO 239
  73 201 CONTINUE
  74 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  75 21 IF (LINK, EQ, 1) GO TO 21
  76 209 IF (J, EQ, 13) GO TO 209
  77 210 IF (J, EQ, 14) GO TO 210
  78 219 IF (J, EQ, 21) GO TO 219
  79 219 IF (J, EQ, 22) GO TO 219
  80 GO TO 220
  81 CONTINUE
  82 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  83 IF (J, GT, 8) GO TO 221
  84 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  85 231 CA = 100 / COLL(1)
  86 GO TO 239
  87 232 CA = 100 / CYCF(1)
  88 GO TO 239
  89 233 CA = 100 / CYCF(1)
  90 GO TO 239
  91 201 CONTINUE
  92 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  93 21 IF (LINK, EQ, 1) GO TO 21
  94 209 IF (J, EQ, 13) GO TO 209
  95 210 IF (J, EQ, 14) GO TO 210
  96 219 IF (J, EQ, 21) GO TO 219
  97 219 IF (J, EQ, 22) GO TO 219
  98 GO TO 220
  99 CONTINUE
  100 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  101 IF (J, GT, 8) GO TO 221
  102 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  103 231 CA = 100 / COLL(1)
  104 GO TO 239
  105 232 CA = 100 / CYCF(1)
  106 GO TO 239
  107 233 CA = 100 / CYCF(1)
  108 GO TO 239
  109 201 CONTINUE
  110 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  111 21 IF (LINK, EQ, 1) GO TO 21
  112 209 IF (J, EQ, 13) GO TO 209
  113 210 IF (J, EQ, 14) GO TO 210
  114 219 IF (J, EQ, 21) GO TO 219
  115 219 IF (J, EQ, 22) GO TO 219
  116 GO TO 220
  117 CONTINUE
  118 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  119 IF (J, GT, 8) GO TO 221
  120 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  121 231 CA = 100 / COLL(1)
  122 GO TO 239
  123 232 CA = 100 / CYCF(1)
  124 GO TO 239
  125 233 CA = 100 / CYCF(1)
  126 GO TO 239
  127 201 CONTINUE
  128 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  129 21 IF (LINK, EQ, 1) GO TO 21
  130 209 IF (J, EQ, 13) GO TO 209
  131 210 IF (J, EQ, 14) GO TO 210
  132 219 IF (J, EQ, 21) GO TO 219
  133 219 IF (J, EQ, 22) GO TO 219
  134 GO TO 220
  135 CONTINUE
  136 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  137 IF (J, GT, 8) GO TO 221
  138 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  139 231 CA = 100 / COLL(1)
  140 GO TO 239
  141 232 CA = 100 / CYCF(1)
  142 GO TO 239
  143 233 CA = 100 / CYCF(1)
  144 GO TO 239
  145 201 CONTINUE
  146 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  147 21 IF (LINK, EQ, 1) GO TO 21
  148 209 IF (J, EQ, 13) GO TO 209
  149 210 IF (J, EQ, 14) GO TO 210
  150 219 IF (J, EQ, 21) GO TO 219
  151 219 IF (J, EQ, 22) GO TO 219
  152 GO TO 220
  153 CONTINUE
  154 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  155 IF (J, GT, 8) GO TO 221
  156 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  157 231 CA = 100 / COLL(1)
  158 GO TO 239
  159 232 CA = 100 / CYCF(1)
  160 GO TO 239
  161 233 CA = 100 / CYCF(1)
  162 GO TO 239
  163 201 CONTINUE
  164 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  165 21 IF (LINK, EQ, 1) GO TO 21
  166 209 IF (J, EQ, 13) GO TO 209
  167 210 IF (J, EQ, 14) GO TO 210
  168 219 IF (J, EQ, 21) GO TO 219
  169 219 IF (J, EQ, 22) GO TO 219
  170 GO TO 220
  171 CONTINUE
  172 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  173 IF (J, GT, 8) GO TO 221
  174 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  175 231 CA = 100 / COLL(1)
  176 GO TO 239
  177 232 CA = 100 / CYCF(1)
  178 GO TO 239
  179 233 CA = 100 / CYCF(1)
  180 GO TO 239
  181 201 CONTINUE
  182 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  183 21 IF (LINK, EQ, 1) GO TO 21
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  185 210 IF (J, EQ, 14) GO TO 210
  186 219 IF (J, EQ, 21) GO TO 219
  187 219 IF (J, EQ, 22) GO TO 219
  188 GO TO 220
  189 CONTINUE
  190 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  191 IF (J, GT, 8) GO TO 221
  192 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  193 231 CA = 100 / COLL(1)
  194 GO TO 239
  195 232 CA = 100 / CYCF(1)
  196 GO TO 239
  197 233 CA = 100 / CYCF(1)
  198 GO TO 239
  199 201 CONTINUE
  200 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  201 21 IF (LINK, EQ, 1) GO TO 21
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  203 210 IF (J, EQ, 14) GO TO 210
  204 219 IF (J, EQ, 21) GO TO 219
  205 219 IF (J, EQ, 22) GO TO 219
  206 GO TO 220
  207 CONTINUE
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  209 IF (J, GT, 8) GO TO 221
  210 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  211 231 CA = 100 / COLL(1)
  212 GO TO 239
  213 232 CA = 100 / CYCF(1)
  214 GO TO 239
  215 233 CA = 100 / CYCF(1)
  216 GO TO 239
  217 201 CONTINUE
  218 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
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  221 210 IF (J, EQ, 14) GO TO 210
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  223 219 IF (J, EQ, 22) GO TO 219
  224 GO TO 220
  225 CONTINUE
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  227 IF (J, GT, 8) GO TO 221
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  229 231 CA = 100 / COLL(1)
  230 GO TO 239
  231 232 CA = 100 / CYCF(1)
  232 GO TO 239
  233 233 CA = 100 / CYCF(1)
  234 GO TO 239
  235 201 CONTINUE
  236 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
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  243 CONTINUE
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  248 GO TO 239
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  250 GO TO 239
  251 233 CA = 100 / CYCF(1)
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  266 GO TO 239
  267 232 CA = 100 / CYCF(1)
  268 GO TO 239
  269 233 CA = 100 / CYCF(1)
  270 GO TO 239
  271 201 CONTINUE
  272 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  273 21 IF (LINK, EQ, 1) GO TO 21
  274 209 IF (J, EQ, 13) GO TO 209
  275 210 IF (J, EQ, 14) GO TO 210
  276 219 IF (J, EQ, 21) GO TO 219
  277 219 IF (J, EQ, 22) GO TO 219
  278 GO TO 220
  279 CONTINUE
  280 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  281 IF (J, GT, 8) GO TO 221
  282 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  283 231 CA = 100 / COLL(1)
  284 GO TO 239
  285 232 CA = 100 / CYCF(1)
  286 GO TO 239
  287 233 CA = 100 / CYCF(1)
  288 GO TO 239
  289 201 CONTINUE
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  292 209 IF (J, EQ, 13) GO TO 209
  293 210 IF (J, EQ, 14) GO TO 210
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  295 219 IF (J, EQ, 22) GO TO 219
  296 GO TO 220
  297 CONTINUE
  298 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  299 IF (J, GT, 8) GO TO 221
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  302 GO TO 239
  303 232 CA = 100 / CYCF(1)
  304 GO TO 239
  305 233 CA = 100 / CYCF(1)
  306 GO TO 239
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  320 GO TO 239
  321 232 CA = 100 / CYCF(1)
  322 GO TO 239
  323 233 CA = 100 / CYCF(1)
  324 GO TO 239
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  329 210 IF (J, EQ, 14) GO TO 210
  330 219 IF (J, EQ, 21) GO TO 219
  331 219 IF (J, EQ, 22) GO TO 219
  332 GO TO 220
  333 CONTINUE
  334 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  335 IF (J, GT, 8) GO TO 221
  336 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  337 231 CA = 100 / COLL(1)
  338 GO TO 239
  339 232 CA = 100 / CYCF(1)
  340 GO TO 239
  341 233 CA = 100 / CYCF(1)
  342 GO TO 239
  343 201 CONTINUE
  344 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  345 21 IF (LINK, EQ, 1) GO TO 21
  346 209 IF (J, EQ, 13) GO TO 209
  347 210 IF (J, EQ, 14) GO TO 210
  348 219 IF (J, EQ, 21) GO TO 219
  349 219 IF (J, EQ, 22) GO TO 219
  350 GO TO 220
  351 CONTINUE
  352 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  353 IF (J, GT, 8) GO TO 221
  354 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  355 231 CA = 100 / COLL(1)
  356 GO TO 239
  357 232 CA = 100 / CYCF(1)
  358 GO TO 239
  359 233 CA = 100 / CYCF(1)
  360 GO TO 239
  361 201 CONTINUE
  362 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  363 21 IF (LINK, EQ, 1) GO TO 21
  364 209 IF (J, EQ, 13) GO TO 209
  365 210 IF (J, EQ, 14) GO TO 210
  366 219 IF (J, EQ, 21) GO TO 219
  367 219 IF (J, EQ, 22) GO TO 219
  368 GO TO 220
  369 CONTINUE
  370 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  371 IF (J, GT, 8) GO TO 221
  372 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  373 231 CA = 100 / COLL(1)
  374 GO TO 239
  375 232 CA = 100 / CYCF(1)
  376 GO TO 239
  377 233 CA = 100 / CYCF(1)
  378 GO TO 239
  379 201 CONTINUE
  380 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  381 21 IF (LINK, EQ, 1) GO TO 21
  382 209 IF (J, EQ, 13) GO TO 209
  383 210 IF (J, EQ, 14) GO TO 210
  384 219 IF (J, EQ, 21) GO TO 219
  385 219 IF (J, EQ, 22) GO TO 219
  386 GO TO 220
  387 CONTINUE
  388 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  389 IF (J, GT, 8) GO TO 221
  390 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  391 231 CA = 100 / COLL(1)
  392 GO TO 239
  393 232 CA = 100 / CYCF(1)
  394 GO TO 239
  395 233 CA = 100 / CYCF(1)
  396 GO TO 239
  397 201 CONTINUE
  398 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  399 21 IF (LINK, EQ, 1) GO TO 21
  400 209 IF (J, EQ, 13) GO TO 209
  401 210 IF (J, EQ, 14) GO TO 210
  402 219 IF (J, EQ, 21) GO TO 219
  403 219 IF (J, EQ, 22) GO TO 219
  404 GO TO 220
  405 CONTINUE
  406 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  407 IF (J, GT, 8) GO TO 221
  408 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  409 231 CA = 100 / COLL(1)
  410 GO TO 239
  411 232 CA = 100 / CYCF(1)
  412 GO TO 239
  413 233 CA = 100 / CYCF(1)
  414 GO TO 239
  415 201 CONTINUE
  416 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  417 21 IF (LINK, EQ, 1) GO TO 21
  418 209 IF (J, EQ, 13) GO TO 209
  419 210 IF (J, EQ, 14) GO TO 210
  420 219 IF (J, EQ, 21) GO TO 219
  421 219 IF (J, EQ, 22) GO TO 219
  422 GO TO 220
  423 CONTINUE
  424 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  425 IF (J, GT, 8) GO TO 221
  426 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  427 231 CA = 100 / COLL(1)
  428 GO TO 239
  429 232 CA = 100 / CYCF(1)
  430 GO TO 239
  431 233 CA = 100 / CYCF(1)
  432 GO TO 239
  433 201 CONTINUE
  434 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  435 21 IF (LINK, EQ, 1) GO TO 21
  436 209 IF (J, EQ, 13) GO TO 209
  437 210 IF (J, EQ, 14) GO TO 210
  438 219 IF (J, EQ, 21) GO TO 219
  439 219 IF (J, EQ, 22) GO TO 219
  440 GO TO 220
  441 CONTINUE
  442 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  443 IF (J, GT, 8) GO TO 221
  444 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  445 231 CA = 100 / COLL(1)
  446 GO TO 239
  447 232 CA = 100 / CYCF(1)
  448 GO TO 239
  449 233 CA = 100 / CYCF(1)
  450 GO TO 239
  451 201 CONTINUE
  452 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  453 21 IF (LINK, EQ, 1) GO TO 21
  454 209 IF (J, EQ, 13) GO TO 209
  455 210 IF (J, EQ, 14) GO TO 210
  456 219 IF (J, EQ, 21) GO TO 219
  457 219 IF (J, EQ, 22) GO TO 219
  458 GO TO 220
  459 CONTINUE
  460 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  461 IF (J, GT, 8) GO TO 221
  462 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  463 231 CA = 100 / COLL(1)
  464 GO TO 239
  465 232 CA = 100 / CYCF(1)
  466 GO TO 239
  467 233 CA = 100 / CYCF(1)
  468 GO TO 239
  469 201 CONTINUE
  470 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  471 21 IF (LINK, EQ, 1) GO TO 21
  472 209 IF (J, EQ, 13) GO TO 209
  473 210 IF (J, EQ, 14) GO TO 210
  474 219 IF (J, EQ, 21) GO TO 219
  475 219 IF (J, EQ, 22) GO TO 219
  476 GO TO 220
  477 CONTINUE
  478 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  479 IF (J, GT, 8) GO TO 221
  480 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  481 231 CA = 100 / COLL(1)
  482 GO TO 239
  483 232 CA = 100 / CYCF(1)
  484 GO TO 239
  485 233 CA = 100 / CYCF(1)
  486 GO TO 239
  487 201 CONTINUE
  488 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  489 21 IF (LINK, EQ, 1) GO TO 21
  490 209 IF (J, EQ, 13) GO TO 209
  491 210 IF (J, EQ, 14) GO TO 210
  492 219 IF (J, EQ, 21) GO TO 219
  493 219 IF (J, EQ, 22) GO TO 219
  494 GO TO 220
  495 CONTINUE
  496 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  497 IF (J, GT, 8) GO TO 221
  498 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  499 231 CA = 100 / COLL(1)
  500 GO TO 239
  501 232 CA = 100 / CYCF(1)
  502 GO TO 239
  503 233 CA = 100 / CYCF(1)
  504 GO TO 239
  505 201 CONTINUE
  506 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  507 21 IF (LINK, EQ, 1) GO TO 21
  508 209 IF (J, EQ, 13) GO TO 209
  509 210 IF (J, EQ, 14) GO TO 210
  510 219 IF (J, EQ, 21) GO TO 219
  511 219 IF (J, EQ, 22) GO TO 219
  512 GO TO 220
  513 CONTINUE
  514 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  515 IF (J, GT, 8) GO TO 221
  516 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  517 231 CA = 100 / COLL(1)
  518 GO TO 239
  519 232 CA = 100 / CYCF(1)
  520 GO TO 239
  521 233 CA = 100 / CYCF(1)
  522 GO TO 239
  523 201 CONTINUE
  524 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  525 21 IF (LINK, EQ, 1) GO TO 21
  526 209 IF (J, EQ, 13) GO TO 209
  527 210 IF (J, EQ, 14) GO TO 210
  528 219 IF (J, EQ, 21) GO TO 219
  529 219 IF (J, EQ, 22) GO TO 219
  530 GO TO 220
  531 CONTINUE
  532 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  533 IF (J, GT, 8) GO TO 221
  534 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  535 231 CA = 100 / COLL(1)
  536 GO TO 239
  537 232 CA = 100 / CYCF(1)
  538 GO TO 239
  539 233 CA = 100 / CYCF(1)
  540 GO TO 239
  541 201 CONTINUE
  542 2013 IF (J, LT, 1, OR, J, GT, 31) GO TO 2013
  543 21 IF (LINK, EQ, 1) GO TO 21
  544 209 IF (J, EQ, 13) GO TO 209
  545 210 IF (J, EQ, 14) GO TO 210
  546 219 IF (J, EQ, 21) GO TO 219
  547 219 IF (J, EQ, 22) GO TO 219
  548 GO TO 220
  549 CONTINUE
  550 WITH (6, 100) J = XCIT(L, K), K = 1, 6)
  551 IF (J, GT, 8) GO TO 221
  552 GO TO (231, 232, 233, 234, 220, 236, 237, 238), J
  553 231 CA = 100 / COLL(1)
  554 GO TO 239
  555 232 CA = 100 / CYCF(1)
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233 DA=100./CYCL(1)
GO TO 239
234 DA=100./PEDA(1)
GO TO 239
235 DA=0TR
GO TO 239
236 DA=1./PIU30
237 XCIT(L,2)=XCIT(L,2)*DA
238 XCIT(L,5)=XCIT(L,5)*DA
IF(XCIT(L,3).EQ.0.) GO TO 220
IF(XCIT(L,4).GE.XCIT(L,3).AND.XCIT(L,6).GE.XCIT(L,4)) GO TO 220
XCIT(L,4)=9999.
XCIT(L,6)=9999.
GO TO 220
221 IF(J.GT.12) GO TO 222
XGUST=XCIT(L,1)
GMAXV1=XCIT(L,2)
LNGTH1=XCIT(L,3)
START2=XCIT(L,4)+LNGTH1
LNGTH2=XCIT(L,5)
GMAXV2=XCIT(L,6)
STOP2=START2+LNGTH2
IF(J.EQ.10.OR.J.EQ.12) GO TO 223
RATE1=0.
IF(LNGTH1.NE.0.) RATE1=GMAXV1/LNGTH1
RATE2=0.
IF(LNGTH2.NE.0.) RATE2=GMAXV2/LNGTH2
GMAXV=GMAXV1+GMAXV2
GMAXV3=GMAXV1-START2*RATE2
GO TO 220
223 PILGH1=0.
IF(LNGTH1.NE.0.) PILGH1=P1/LNGTH1
PILGH2=0.
IF(LNGTH2.NE.0.) PILGH2=P1/LNGTH2
GO TO 220
222 K=J-12
GO TO (220,220,211,212,213,214,215,216,220,220,220,220,220,220,
1 211,282,283,284,286),K
209 XCIT(L,6)=XCIT(L,2)*OMR
GO TO 220
210 INDIC=XCIT(L,2)+.01
IF(INDIC.NE.2) GO TO 220
INDIC=XCIT(L,6)+.01
IF(INDIC.LT.1.OR.INDIC.GT.2) GO TO 2013
XCIT(L,5)=TAX(INDIC)
XCIT(L,2)=1.
GO TO 220
211 XCIT(L,2)=XCIT(L,2)*OTR
XCIT(L,3)=XCIT(L,3)/PEDA(3)
XCIT(L,4)=XCIT(L,4)/PEDA(3)
GO TO 220
212 IF(XCIT(L,2).EQ.0.) XCIT(L,2)=9999.
XCIT(L,5)=0.
IF(XCIT(L,4).NE.0.) XCIT(L,5)=XCIT(L,3)/XCIT(L,4)

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IVAR0990
IVAR1000
IVAR1010
IVAR1020
IVAR1030
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IVAR1050
IVAR1060
IVAR1070
IVAR1080

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GO TO 220
213 XCIT(L,2)=XCIT(L,2)*DIR
    XCIT(L,5)=XCIT(L,5)*DIR
    XCIT(L,4)=HALFPI/(HALFPI-XCIT(L,5))
    XCIT(L,6)=-XCIT(L,6)*XCIT(L,4)/PIU30
GO TO 220
214 CONTINUE
    XCIT(L,2)=XCIT(L,2)/PIU30
    PSISTP=XCIT(L,3)*DIR
    OMRARAK=XCIT(L,1)
GO TO 220
215 CONTINUE
    XCIT(L,2)=XCIT(L,2)/CYCF(3)
    XCIT(L,3)=XCIT(L,3)/CYCF(3)
    XCIT(L,4)=XCIT(L,4)/CYCF(3)
    XCIT(L,5)=XCIT(L,5)*DIR
GO TO 220
217 CONTINUE
    XCIT(L,4)=XCIT(L,4)*DIR
    XCIT(L,5)=XCIT(L,5)*DIR
GO TO 211
218 CONTINUE
    IF(XCIT(L,6)-F0.0.) GO TO 217
    XCIT(L,4)=A1M
    XCIT(L,5)=R1M
GO TO 211
219 CONTINUE
    IF(XCIT(L,6)-EQ.0.) GO TO 217
    XCIT(L,4)=A1TR
    XCIT(L,5)=B1TR
GO TO 211
216 XCIT(L,2)=XCIT(L,2)*TWOPI
    XCIT(L,3)=XCIT(L,3)*XCIT(L,2)
    K=XCIT(L,5)+.1
    IF(K-LT.1.OR.K-GT.5) GO TO 2013
GO TO (271,272,273,274,275),K
280 CONTINUE
    N=XCIT(L,1)+.1
    HUBKM(1,N)=1.E+20
    HUBKM(2,N)=1.E+20
    XCIT(L,3)=XCIT(L,3)/PIU30
    DRPM=XCIT(L,4)/PIU30-XCIT(L,3)
    XCIT(L,2)=XCIT(L,2)*DIR
    IF(DRPM-EQ.0.) GO TO 281
    -HUBKM(1,N)=(HUBKM(N,1)-XCIT(L,2))/DRPM
    HUBKM(2,N)=(HUBKM(N,2)-XCIT(L,2))/DRPM
281 CONTINUE
    HUBKI(1,N)=XCIT(L,2)-HUBKM(1,N)*XCIT(L,3)
    HUBKI(2,N)=XCIT(L,2)-HUBKM(2,N)*XCIT(L,3)
    XCIT(L,3)=HUBK(N,1)
    XCIT(L,4)=HUBK(N,2)
    HUBK(N,1)=XDELIM(XCIT(L,3),XCIT(L,2),
1 HUBKM(1,N)*PS10(N)+HUBKI(1,N))
    HUBK(N,2)=XDELIM(XCIT(L,3),XCIT(L,2),

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IVAR1094
IVAR1100
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1      GO TO 220
282 CONTINUE
      N=XCIT(L,1)+.1
      XCIT(L,5)=1.E+20
      XCIT(L,3)=XCIT(L,3)/PIU30
      DRPM=XCIT(L,4)/PIU30-XCIT(L,3)
      XCIT(L,2)=XCIT(L,2)+DTR
      IF(DRPM.NE.0.) XCIT(L,5)=(BETAN(N)-XCIT(L,2))/DRPM
      XCIT(L,4)=XCIT(L,2)-XCIT(L,5)*XCIT(L,3)
      XCIT(L,3)=BETAN(N)
      XCIT(L,6)=0.
      GO TO 220
283 CONTINUE
      IF(XCIT(L,5).LE.0..OR.XCIT(L,5).GT.15.) XCIT(L,5)=15.
      XCIT(L,6)=0.
      GO TO 220
284 CONTINUE
      DO 285 K=3,5
      XCIT(L,K)=XCIT(L,K)+DTR
285 CONTINUE
      IF(XCIT(L,6).LT..5) XCIT(L,6)=.5
      XCIT(L,6)=XCIT(L,6)+DTR
      GO TO 220
286 CONTINUE
      IF(XCIT(L,3).LE.XCIT(L,1)) XCIT(L,3)=9999.
      IF(XCIT(L,5).LE.XCIT(L,3)) XCIT(L,5)=9999.
      GO TO 220
271 CONTINUE
      XCIT(L,3)=XCIT(L,3)+100./COLL(1)
      GO TO 220
272 XCIT(L,3)=XCIT(L,3)+100./CYCF(1)
      GO TO 220
273 XCIT(L,3)=XCIT(L,3)+100./CYCL(1)
      GO TO 220
274 XCIT(L,3)=XCIT(L,3)+100./PEDA(1)
      GO TO 220
275 CONTINUE
      XCIT(L,3)=XCIT(L,3)+DTR
220 CONTINUE
      RETURN
2013 WRITE (6,2014) L,J
      EXIT=1.
      RETURN
108 FORMAT (1H,25X,110.6F10.3)
2014 FORMAT (1H0,'CHECK PART 2 DATA CARD ',12,' J CODE IS ',12)
      END

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IVAR1630
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 IVAR2090

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SUBROUTINE JACOBI
COMMON /STRIB/ D(21),DT(21),F(79),F(19),X(10),
1 DL,DM,DM,DX,DY,DZ,IX,IY,IZ,PD(10,11),
2 DTR,FPO,ERR(10),KMI,KMO,
3 R12,SPD(6,6,3),XRM(21),XEL(14),
4 XER(7),XFC(28),XFM(7),XFS(15),
5 XGM(7),XIT(21),XMR(49),XTR(49),
6 XMG(21),YMR(21),YTR(21),YMG(21),
7 YEL(21),YFM(21),BLCG,DAMP,DEPD(19),
8 CPDS,EPDX(10),MASS,OSV1,THRS,TTRS,
9 WLCG,XCON(63),XJET(14),XMIN,AYEFP,
A RETAES(2),CHPCD,DHADO,DYRDR,GUESS,
B NPASS,PPPH(19,11),STACG,YZERO,
C XMAST,CHADAO,DODCOL,DTRRSO,NYBOOR,
D ENGRDM,XPDASS,PSD3OP,TRINDI,XLIMIT
COMMON /MANARD/ I,V,IND,MAG,APMT,ARMT,AYBMT,RETAO(2),TDELT,
1 RETAE(2),MGUSTF,MGUSTF,MGUSTM,VGUSTF,
2 VGUSTM,VGUSTF,GFWD,GLAT,GVERT,
3 VXB,VZB,APD,VVR,ARD,AYD,
4 COLSTK,CYSTK1,CYSTK2,PEDAL,AYE,
5 APE,ARE,AIM,BIM,AITP,AITR,
6 YAR(2),YAR(2),ZAR(2),
7 VIMR,VITR,ZETA,ZETATR,HMR,MTR,
8 THR,TTR,OMX,OTR,YMRF,YTRF
COMMON /TOPLDT/ AH(3),AL(3),EXIT,ICOM(49),IPSN,
1 NPART,NVARA,NVARR,NVARC,NSCALE
COMMON /KVARTR/ KVAR(10)
DIMENSION VAR(11)
EQUIVALENCE (VAR(1),COLSTK)
DO 55 L=1,KMI
HETAF(1)=RETAES(1)
HETAF(2)=RETAES(2)
THR=THPS
TTR=TTDS
VAR(KVAR(L))=VAR(KVAR(L))+DEPD(L)
IF(L-GT,1) VAR(KVAR(L-1))=VAR(KVAR(L-1))-DEPD(L-1)
CALL AJACOB
IF(EXIT,NE,0.) RETURN
IF(L,EO,1) DODCOL=(.5*(OMX+OTR)-OSV1)/DEPD(1)
DO 41 K=1,KMI
41 PD(K,L)=(F(K)+PD(K,KMI+1))/EPD
55 CONTINUE
VAR(KVAP(KMI))=VAR(KVAR(KMI))-DEPD(KMI)
RETURN
END

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JAC000310
JAC000320
JAC000330
JAC000340
JAC000350
JAC000360
JAC000370
JAC000380
JAC000390
JAC000400
JAC000410
JAC000420
JAC000430
JAC000440
JAC000450

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SUBROUTINE LAMODE (V,QMG,ZFM,SWING)
COMMON /STRIAB/ D(21),DT(21),E(19),F(10),X(10),
1 DL,DM,DN,DX,DY,DZ,IX,IY,IZ,PO(10,11),
2 DTR,EPD,EPR(10),KML,RMD,
3 R12,SPD(6,6,3),XBM(21),XEL(14),
4 XER(7),XFC(28),XFN(7),XFS(35),
5 XGN(7),XIT(21),XMP(49),XTR(49),
6 XWG(21),YMR(21),YTR(21),YWG(21),
7 YEL(21),YFN(21),BLCG,XDAMP,DEPO(10),

      DAMP MUST HAVE ITS NAME CHANGED HERE TO AVOID
      CONFLICT WITH COMMON /TRONIC/

      EPDS,EPDX(10),MASS,OSV1,TM,S,ITRS,
      WLCG,XCON(63),XJET(14),XMIN,AYEFP,
      RETAES(2),CMPCD,DMADQ,DYBDR,GUESS,
      NPASS,PDPH(10,11),STACG,TZERO,
      XMAST,DMADAO,DQDCDL,DTRRSQ,DYBDR,
      ENGRPM,MXPASS,PSD3OP,TRIM01,XLIMIT
COMMON /TRONIC/ UU(6),VV(6),TAU(22),DAMP(22),NUMRTS,GAINB,
1 INDEX,STGAIN(6),TSTAR,COELTD,SLOT(3,9)
1 DIMENSION PLMODE(6),FLMODE(6),THLFDB(6),TZEROM(6),
1 FANG2(6),RODOT(2,3), ZLNT1(6),FANG1(6),ZLNT2(6)
1 DIMENSION UDSLOT(11,3),HEAD(2),KS(3),LS(2)
DATA HEAD/, NON-/,KS/2,6,4/,LS/3,4/
REAL IX, IZ,MASS
COMPLEX RODOT
WRITE (6,556)
DO 333 J=1,3
DO 333 I=1,9
333 SLT(J,I)=0.0
DO 406 I=1,4
PLMODE(I)=0
FLMODE(I)=0
THLFDB(I)=0
TZEROM(I)=0
406 CONTINUE
TSTAR=SWING/(2.*V)
SLOT(1,2)=MASS
SLOT(1,3)=-SPD(4,4,1)
SLOT(1,5)=-SPD(5,4,1)/V
SLOT(1,6)=-ZFM/V
SLOT(1,9)=MASS-SPD(6,4,1)/V
SLOT(2,3)=-SPD(4,5,1)
SLOT(2,4)=IX/V
SLOT(2,5)=-SPD(5,5,1)/V
SLOT(2,8)=-XFS(11)/V
SLOT(2,9)=-SPD(6,5,1)/V
SLOT(3,3)=-SPD(4,6,1)
SLOT(3,4)=SLT(2,9)
SLOT(3,5)=-SPD(5,6,1)/V
SLOT(3,8)=IZ/V
SLOT(3,9)=-SPD(6,6,1)/V
WRITE (4,557) HEAD(1)

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LAM00010
 LAM00020
 LAM00030
 LAM00040
 LAM00050
 LAM00060
 LAM00070
 LAM00080
 LAM00090
 LAM00100
 LAM00110
 LAM00120
 LAM00130
 LAM00140
 LAM00150
 LAM00160
 LAM00170
 LAM00180
 LAM00190
 LAM00200
 LAM00210
 LAM00220
 LAM00230
 LAM00240
 LAM00250
 LAM00260
 LAM00270
 LAM00280
 LAM00290
 LAM00300
 LAM00310
 LAM00320
 LAM00330
 LAM00340
 LAM00350
 LAM00360
 LAM00370
 LAM00380
 LAM00390
 LAM00400
 LAM00410
 LAM00420
 LAM00430
 LAM00440
 LAM00450
 LAM00460
 LAM00470
 LAM00480
 LAM00490
 LAM00500
 LAM00510
 LAM00520
 LAM00530
 LAM00540

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WRITE (6,555) ISLOT(1,J),J=(1,9),PD(1,3),PD(2,4),ISLOT(2,J),J=(1,9),LAMO555
1 PD(6,3),PD(6,4),ISLOT(3,J),J=(1,9),PD(4,3),PD(4,4) LAMO560
WRITE (6,557) HEAD(2) LAMO570
JIV)=2,0QMG0V LAMO580
DIV2=DIV1*SMING LAMO590
CALL MODSLOT (DIV1,DIV2,TSTAR,PD,SLOT,KS,LS,UOSLOT,TSTAR) LAMO600
WRITE (6,555) UOSLOT LAMO610
WRITE (6,777) LAMO620
CALL SRT LAMO630
INDEX=6 LAMO640
CALL ELEC (GAINB) LAMO650
DO 807 I=1,NUMRTS LAMO660
IF(UU(I).EQ..0.AND.VV(I).EQ..0) GO TO 899 LAMO670
IF(VV(I).EQ..0)GO TO 85) LAMO680
PLMODE(I)=6.2832/ABSIVV(I) LAMO690
FLMODE(I)=1./PLMODE(I) LAMO700
45) IF(UU(I).EQ..0) GO TO 899 LAMO710
THLFD8(I)=.69315/ABS(UU(I)) LAMO720
GO TO 807 LAMO730
899 IZERON(I)=1 LAMO740
807 CONTINUE LAMO750
DO 465 I=1,NUMRTS LAMO760
IF(I2FROM(I).NE.0) GO TO 465 LAMO770
REL=UU(I)*SLOT(1,2)*SLOT(1,3) LAMO780
ZPRT=VV(I)*SLOT(1,2) LAMO790
R000T(1,2)=CMPLX(REL,ZPRT) LAMO800
ZELP=-(UU(I)*SLOT(1,5)*SLOT(1,6) LAMO810
ZPRT= -VV(I)*SLOT(1,5) LAMO820
R000T(1,3)=CMPLX(REL,ZPRT) LAMO830
R000T(2,1)= CMPLX(SLOT(2,3),0) LAMO840
REL= UU(I)*SLOT(2,8)*SLOT(2,9) LAMO850
ZPRT= VV(I)*SLOT(2,8) LAMO860
R000T(2,2)=CMPLX(REL,ZPRT) LAMO870
REL= -(UU(I)*SLOT(2,4)*SLOT(2,5)) LAMO880
ZPRT= -(VV(I)*SLOT(2,4)*SLOT(2,5)) LAMO890
R000T(2,3)=CMPLX(REL,ZPRT) LAMO900
CALL COMSOL (R000T,RPRT(1,ZPT),RPRT2,ZPT2) LAMO910
ZLNT1(I)=SORT( RPRT1*RPRT1*ZPT)*ZPT) LAMO920
IF(RPRT1.EQ..0) GO TO 463 LAMO930
FANG1(I)=57.30ATAN2(ZPT1,RPRT1) LAMO940
GO TO 464 LAMO950
463 FANG1(I)=90. LAMO960
464 ZLNT2(I)= SORT((RPRT2*UU(I)*ZPT2*VV(I))**2 +I2PT2*UU(I)*RPRT2*
(VV(I))**2)/(UU(I)**2+VV(I)**2) LAMO970
IF(RPRT2.EQ..0) GO TO 4645 LAMO980
FANG2(I)=57.30ATAN2(I2PT2*UU(I)*RPRT2*VV(I)),(RPRT2*UU(I)*ZPT2*VV(I)
1(I)) LAMO990
GO TO 466 LAMO1000
4645 FANG2(I)=90. LAMO1010
466 CONTINUE LAMO1020
465 CONTINUE LAMO1030
DO 828 I=1,NUMRTS LAMO1040
IF(VV(I).LT..0) GO TO 828 LAMO1050
LAMO1060
LAMO1070
LAMO1080

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IF(IZERON(1),ME,0) GO TO 928
WRITE(6,729)UU(1),VV(1),PLMODE(1),FLMODE(1),TMLF08(1),ZLMT1(1),FANLAMO1100
151(1),ZLMT2(1),FANG2(1),COELTD
A28 CONTINUE
1=1
CALL MODE (PD,V,1)
RETURN
727 FORMAT (1H0,5X,'CONTROLS FIXED',7X,'R D O Y S',46X,
1L,'ROLL ANG.',8X,'YAW ANG./ROLL ANG.',5X,'REAL',8X,'IMAG.',8X,'PELAMO1160
2H100',5X,'FREQUENCY TOWALE-DRL',6X,'MAGN.',9X,'PHASE',7X,'MAGN.',LAM01180
3,8X,'PHASE',5X,'LEAD COEF.',)
729 FORMAT(1H,10G13.5)
556 FORMAT (1H1,60X,'LATERAL MODE',)
557 FORMAT (1H0,38X,44,
1 'DIMENSIONAL COEFFICIENTS OF CHARACTERISTIC EQUATIONS'
2 /' BETA-S002 BETA-S',6X,'BETA',9X,'PHI-S002 PHI-S',
3 9X,'PHI',8X,'R-S002',6X,'R-S',11X,'R',7X,
4 'LAT CYCLIC PEDAL',)
555 FORMAT (1H,610.2,10G12.5)
END
LAM01090
LAM01100
LAM01110
LAM01120
LAM01130
LAM01140
LAM01150
LAM01160
LAM01170
LAM01180
LAM01190
LAM01200
LAM01210
LAM01220
LAM01230
LAM01240
LAM01250
LAM01260
LAM01270
LAM01280

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STARTTIME LMDE (V,QMG,XFM,ZFM,CWING,XAELE)
COMMON /STR(48) D(21),DT(21),E(79),F(10),X(10),
1 DL,DH,ON,DX,DY,DZ,IX,IY,IZ,PO(10,11),
2 NTR,FPO,ERR(10),KMI,RND,
3 R12,SPD(6,6,3),XRM(21),XEL(14),
4 XER(7),XFC(28),XFN(7),XFS(35),
5 XGN(7),XIT(21),XMR(49),XTR(49),
6 XWG(21),YMR(21),YTP(21),YWG(21),
7 VEL(21),YFN(21),ALCG,XDAMP,DEPD(10),

OAMP MUST HAVE ITS NAME CHANGED HERE TO AVOID
CONFLICT WITH COMMON /TRONIC/

8 FPOS,EPDX(10),MASS,QSV1,THRS,TTAS,
9 WLCG,XCON(63),XJET(14),XMIN,AVEFP,
A RTAFS(2),CMPCN,DHADO,DYADR,GUESS,
H NPASS,PDPH(10,11),STACG,TZERO,
C XMAST,DHADAQ,DQDCOL,DTRSQ,DYBDB,
E ENGRPH,XYPASS,PCN30P,TRIND1,XLIMIT
COMMON /STANRO/ J,W,ITM,VMS(2),LINK,OELE,VROT(2),
1 VSD,VFIN(2),ZFEL(2),AIBAL(2),
2 AIBAL(2),CONDI,SWING,PILGM2,PMGELL,
3 RM,ATR,PHOMM,PHONT,RHOMM,RHOMT
COMMON /TRONIC/ UU(4),VV(6),TAU(22),DAMP(22),NURTS,GAINR,
1 INDEX,STGAIN(6),TSTAR,CDELTD,SLOT(3,9)

REAL IV,MASS
DIMENSION PLMODE(6),FLMODE(6),THL FDB(6),TZERON(6),
1 FANG2(6),ROOT(2,3), ZLNT(6),FANGI(6),ZLNT2(6)
DIMENSION UNLSLOT(11,3),HEAD(1),KS(3),LS(2)
DATA HEAD/1 NON=1/ KS/1,3,5/ LS/2,1/
COMPLEX ROOT
WRITE (6,556)
DO 706 I=1,4
PLMODE(I)=0
FLMODE(I)=0
THL FDB(I)=0
TZERON(I)=0
706 CONTINUE
DO 703 I=1,3
DO 703 J=1,9
SLNT(I,J)=0
703 CONTINUE
TSTAR=CWING/(2*V)
SLNT(1,2)=MASS
SLNT(1,3)=SPD(1,1,1)
SLNT(1,6)=SPD(2,1,1)
SLNT(1,9)=SPD(3,1,1)/V
SLNT(1,9)=ZFV/V
SLNT(2,3)=SPD(1,2,1)
CZADE=VEL(17)*OELE*AELE*VWG(17)*PMGELL*VWG(18)*VEL(18)*OTRARSO/
1 ((3+VWG(19))*((3+VEL(18))*((1-(V*VSD))**2)))
SLNT(2,5)=MASS-CZADE
SLNT(2,9)=SPD(2,2,1)
SLNT(2,9)=-(MASS*SPD(3,2,1)/V)

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SLOT(2,9)=--XFW/V
SLOT(3,3)=--SPO(1,3,1)
SLOT(3,5)=CZADEXAELE
SLOT(3,6)=--SPO(2,3,1)
SLOT(3,7)=1V/V
SLOT(3,8)=--SPO(3,3,1)/V
WRITE(6,557) HEAD(1)
WRITE(6,558) (SLOT(1,J),J=1,9),PO(1,2),PO(1,1),ISLOT(2,J),J=1,9),
(PO(3,2),PO(3,1))-(SLOT(3,J),J=1,9),PO(5,2),PO(5,1)
WRITE(6,557) HEAD(2)
JIV2=2.00MGCV
JIV1=DIV2*CHWING
CALL MDISLOT (DIV1,0IV2,TSTAR,PO,SLOT,3,KS,LS,UDSLOT,1,1)
WRITE(6,558) UDSLOT
WRITE(6,727)
CALL SRT
INDEX=6
CALL ELEC (GAINB)
DO 707 I=1,NUMPTS
IF(UJ(I),EQ,.C.AMO,VV(I),EQ,.C) GO TO 799
IF(VV(I),EQ,.C)GO TO 751
PLMODE(I)=6.2832/ABS(VV(I))
CLMCF(I)=1./PLMODE(I)
751 IF(UJ(I),EQ,.C) GO TO 799
TMLFDA(I)=.69315/ABS(UJ(I))
GO TO 707
799 IZERON(I)=1
707 CONTINUE
DO 365 I=1,NUMPTS
IF(IZERON(I),NE,0) GO TO 365
R00NT(1,1)=CMPLX(SLOT(2,3),.C)
RELPR=UJ(1)*SLOT(2,5)+SLOT(2,6)
ZPRT=VV(1)*SLOT(2,5)
P00NT(1,2)=CMPLX(RELP,ZPRT)
RELPR=SLOT(2,7)*VV(1)+UJ(1)*VV(1)-SLOT(2,8)*UJ(1)
-SLOT(2,9)
ZPRT=-(2.*UJ(1)*VV(1)+SLOT(2,7)+VV(1)*SLOT(2,8))
R00NT(1,3)=CMPLX(RELP,ZPRT)
R00NT(2,1)=CMPLX(SLOT(3,3),.C)
RELPR=SLOT(3,5)*UJ(1)+SLOT(3,6)
ZPRT=VV(1)*SLOT(3,5)
R00NT(2,2)=CMPLX(RELP,ZPRT)
RELPR=-(SLOT(3,7)*2.*UJ(1)+UJ(1)*VV(1)+SLOT(3,8)*VV(1))
R00NT(2,3)=CMPLX(RELP,ZPRT)
CALL COMSOL (R00NT,RPRT1,ZPT1,RPRT2,ZPT2)
ZLNT(1)=SORT( RPRT1 **2 + ZPT1 **2)
IF(RPRT1 **2.EQ.,0)GO TO 363
FANG1(1)=ATAN2(ZPT1,RPRT1)/OTR
GO TO 364
363 FANG1(1)=.0.
364 ZLNT2(1)= SORT(RPRT2**2 +ZPT2**2)
IF(RPRT2 **2.EQ.,0)GO TO 3645
FANG2(1)=ATAN2(ZPT2,RPRT2)/OTR

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      GO TO 366
365  F2 72(1)=FANG1(1)*90.
366  CONTINUE
369  CONTINUE
      GO 72# I=1,NUMRTS
      IF(VV(1).LT.-.01) GO TO 72A
      IF(1/2*FRONT(1).NE.0)GO TO 72B
      WRITE(6,729) UU(1),VV(1),PLMODE(1),FLMODE(1),TMLFDR(1),ZLMT(1),
1  FANG1(1),ZLMT2(1),FANG2(1),COELTD
72A  CONTINUE
      I=2
      CALL MODE (PD,V,1)
      RETURN
727  FORMAT (1H0,58X,'CONTROLS FIXED',7X,'R 0 0 7 5',46X,
1  IL/THETA',15X,'ALPHA/THETA',/5X,'REAL',.8X,'IMAG',.8X,'PERIOD',5X,'FLMODE1230
2  FREQUENCY  T=HALF-OBL',6X,'MAGN',.9X,'PHASE',.7X,'MAGN',.8X,'PHASE',
3  ,5X,'LEAD COEF',)
729  FORMAT(1H ,10G13.5)
556  FORMAT (1H1,57X,'(LONGITUDINAL MODE',)
557  FORMAT (1H0,18X,A4,
1  ' DIMENSIONAL COEFFICIENTS OF CHARACTERISTIC EQUATIONS'
2  /3X,'U-Soo?  U-S',11X,'U',6X,'ALPHA-Soo2  ALPHA-S',
3  6X,'ALPHA  THETA-Soo?  THETA-S',7X,'THETA',5X
4  ' F/A CYCLIC COLLEC',)
555  FORMAT (1H ,G10.2,10G12.5)
      END

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SUBROUTINE MANU

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COMMON /FORCE/
1  XF,XFRWG,XFLWG,XFELE,XFFUS,XFRJET,
2  XFLJET,XFMR,XFTR,XFGUN,XFFIN,XFM,
3  YF,YFFUS,YFRJET,YFLJET,YFMR,YFTR,
4  YFGUN,YFFIN,YFM,
5  ZF,ZFRWG,ZFLWG,ZFELE,ZFFUS,ZFRJET,
6  ZFLJET,ZFMR,ZFTR,ZFGUN,ZFM,
7  QL,LRWG,LLWG,LELF,LFUS,LJJET,LLJET,
8  LMR,LTR,LGUN,LFIN,LQMR,LQTR,
9  OM,MRWG,MLWG,MELE,MFUS,MRJET,MLJET,
10 MMR,MTR,NGUN,MFIN,MQMR,MQTR,
11 OM,MRWG,MLWG,MELE,MFUS,MRJET,MLJET,
12 MMR,MTR,NGUN,MFIN,MQMR,MQTR,
13
COMMON /STRIMA/
1  AY,VH,AGM,DT1(2),DT2(2),IXZ,
2  OMR,XID,VYD,ZZO,ALGF,APFP,AYFP,
3  CGWL,COLL(6),CYCF(3),CYCL(3),
4  DIST,KCIT(20),PEDA(3),OMAX,
5  OMRS,TIMF,TMAX,XCIT(20,6),ALGEZ,
6  ALGE1,ALGE2,CGSTA,CPWIC,DIXIZ,
7  DIVIX,DIZIV,DTZMY,DTZM1,DTZT1,FTKTS,
8  HUBKM(2,2),MURKI(2,2),
9  KREAD,PIUTO,TSTAB(14),ZMAX2,ZMAX3,
10 ASECOL,CYPWIC,GEARAT,PSO550,
11 PSTSTP,ORBRK,RUDIND,ZDELT1,ZDELT2
COMMON /STAMAN/
1  HL(2),XX,VY,AV1,GOV,KPD,OPC,OOO,
2  RIY,APRG,ARBG,ASEP,AYBG,BWTC,
3  RC,BWTK,BWTK,CGBL,DPIX,DPIZ,
4  FMPT(2),RSSO,ALEPT,AYDMX,DELT2,
5  DPIKZ,DTANT,DWLCG,MDLT,HGUST,
6  HLTR1,HLTR2,ITORS,KTCTR,DMEGM,
7  PCDEL,OMRSA,RMASS,TRALT,TMOPI,VGUST,
8  ISTOP,XAGUN,XAPYL,XARSP(2),YAGUN,
9  YARSP(2),YGUST,7AGUN,ZAPYL,ZARSP(2),
10 DELT2R,DSTAGG,EIMAST,GPRELD,MLPYLD,
11 LBRKE,DMEGMD,ORRAKE,BETAZS(2),
12 PCGDED,PCGNAX,PCRATE,POLDTR,RDELT1,
13 RDELT2,RITORS,TRIND2
COMMON /MANAL/
1  O,AP,PED,OWG,TZM,YIM,TZM,
2  TZT,TIT,T2T,ALEL,CZET,PSDD,
3  SZFT,TAXL,TAXR,XAWG,XLMK(16),ZAWG,
4  ALCYP,ALFIN,ALLWG,ALRWG,CDELE,CDFIN,
5  COLWG,CORWG,CLELE,CLFIN,CLLWG,CLRWG,CWING,
6  CYCRL,CYCRL,CZET4,CZET6,CZET9,RANGE,
7  SZETS,SZET7,SZET8,WGCOL,XAELE,XAFIN,
8  XAFUS,XAJFT,YAFIN,ZAELE,ZAFIN,ZAFUS,
9  YAFLE,YAFUS,YALWG,YARWG,YALJFT,YARJET,
10 ZAJET,ALECR1,ALGFPD,BOTTOM,CZET11,
11 CZET12,CZET13,FIZETA,MALFPI,SZET10,
12 XAPYLD,YGUSTM,ZAPYLD,ZFLWG1,ZFRWG1,
13 TZMS,TIMS,TZMS,TZTS,TITS,TZTS,
14 CLOCK,FLOCK,XLOCK,ICLOCK
COMMON /ROMAN/
1  ZZ,VXS(2),VYS(2),VZS(2),BETA(12,2),
2  T,PCC(2),CQSE(7,7,2),BETAM(2),BETAX(2),BETAZ(2),
3  A19(2),APDD,ARDD,AYDD,AIR(2),

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MANU0010
MANU0020
MANU0030
MANU0040
MANU0050
MANU0060
MANU0070
MANU0080
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MANU0500
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MANU0530
MANU0540

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1      NPSI(12,2),NTRR,NPSI(2),ZZTR,
2      BETAD(12,2),ANPSI(2),
3      COMD2,GMAXV,RATE1,RATE2,STOP2,
4      THROT(2),TRIND,XGUST,BETA2D(2),GMAXV1,
5      GMAXV2,GMAXV3,GUSTYP,MNPSTR(2),
6      HUBKPS,HUBKRS,HUBTPS,HUBTRS,
7      KONFIG,LNGTH1,PILGH1,PSIREF(2),
8      START2,XDOML1(12,2),
9      RM,RTR,ORM,ORTR,TIMT,TITT,
10     T2MT,T2TT,TZMT,TZTT,XMAL,XMALT,
11     XMB1,XMBIT,ATOPM,ATOPT,ATARM,ATART,
12     APTD,APYTD,ARTD,ARTTD,PSD,PSDT,
13     XSTAHM,XSTAHM,YSTAHM,YSTAHM,
14     HUBKP,HUBKTP,HUBKR,HUBKTR
15     ,AZETA,AZETAT,VZETA,VZETAT
16     /MANAPO/ 1,V,IND,MWAG,APRMT,ARMT,AYBMT,BETA0(2),TDELT,
17     METAE(2),HGUSTE,HGUSTF,HGUSTM,VGUSTE,
18     VGUSTM,VGUSTF,GFWD,GLAT,GVERT,
19     VXB,VZB,APD,VVB,ARD,AYD,
20     COLSTR,CYSTK1,CYSTK2,PEDAL,AYE,
21     APE,ARE,AIM,BIM,ALTR,BLTR,
22     XAR(2),YAR(2),ZAR(2),
23     VIMR,VITR,ZETA,ZETATR,MNR,MTR,
24     TMR,TTR,OMR,OTR,YMRF,YTRF
25     /TOPLOT/ AM(3),AL(3),EXIT,ICNM(49),IPSM,
26     MPART,NVARA,NVARB,NVARC,NSCALE
27     ,NVAR,NPRINT,NTIME
28     /FORV/ V(4,150),CLO(4,2)
29     /STANRD/ J,M,LM,VMS(2),LINK
30     DATA FOURPI/12.56637/
31     REAL LP, NP,IXZ,ITORS
32     DIMENSION A(266),PSID(2),FLAP(2,2),HUBKS(2,2),HUBK(2,2),
33     ARDR(2),APDR(2)
34     EQUIVALENCE (A(1),V(1,1)),(PSID(1),PSD),(FLAP(1,1),A1M),
35     (APDR(1),ARTD),(APDR(1),APTD)
36     , (HUBKS(1,1),HUBKPS),(HUBK(1,1),HUBKP)
37     XDELIM(X1,X2,X3)-AMAX1(X1,AMIN1(X2,X3))
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PART 3. ELEVEN DEGREE OF FREEDOM MANEUVER SECTION

SYMBOL IDENTIFICATION

V(1, 1)	VXB	VELOCITY	X-COMPONENT	BODY REFERENCE
V(1, 2)	VYB	VELOCITY	Y-COMPONENT	BODY REFERENCE
V(1, 3)	VZB	VELOCITY	Z-COMPONENT	BODY REFERENCE
V(1, 4)	AYD	VELOCITY	YAW-COMPONENT	BODY REFERENCE
V(1, 5)	APD	VELOCITY	PITCH-COMPONENT	BODY REFERENCE
V(1, 6)	ARD	VELOCITY	ROLL-COMPONENT	BODY REFERENCE
V(1, 7)	PSD	VELOCITY	RPM-COMPONENT	YPP REFERENCE
V(1, 10)	AVE	EULER ANGLE	YAW-COMPONENT	FIXED TO BODY
V(1, 11)	APE	EULER ANGLE	PITCH-COMPONENT	FIXED TO BODY
V(1, 12)	ARE	EULER ANGLE	ROLL-COMPONENT	FIXED TO BODY
V(1, 13)	DTGMT	DISP	DELTA T2M FROM BODY	ROTOR REFERENCE
V(1, 14)	DTGMTD	VFL	DELTA T2M FROM BODY	ROTOR REFERENCE

V(1.15)	XR	DISPLACEMENT	X-COMPONENT	FIXED REFERENCE	MANU1090
V(1.16)	YV	DISPLACEMENT	Y-COMPONENT	FIXED REFERENCE	MANU1100
V(1.17)	ZZ	DISPLACEMENT	Z-COMPONENT	FIXED REFERENCE	MANU1110
V(1.76)	VXB0	ACCELERATION	X-COMPONENT	BODY REFERENCE	MANU1120
V(1.77)	VYB0	ACCELERATION	Y-COMPONENT	BODY REFERENCE	MANU1130
V(1.78)	VZB0	ACCELERATION	Z-COMPONENT	BODY REFERENCE	MANU1140
V(1.79)	AVB0	ACCELERATION	YAW-COMPONENT	BODY REFERENCE	MANU1150
V(1.80)	APB0	ACCELERATION	PITCH-COMPONENT	BODY REFERENCE	MANU1160
V(1.81)	ARB0	ACCELERATION	ROLL-COMPONENT	BODY REFERENCE	MANU1170
V(1.84)	PSB0	ACCELERATION	RPM-COMPONENT	TPP REFERENCE	MANU1180
V(1.85)	AVB0	FUL.ANG.VEL.	YAW-COMPONENT	FIXED TO BODY	MANU1190
V(1.86)	APB0	FUL.ANG.VEL.	PITCH-COMPONENT	FIXED TO BODY	MANU1200
V(1.87)	ARB0	FUL.ANG.VEL.	ROLL-COMPONENT	FIXED TO BODY	MANU1210
V(1.98)	OTBMTD	VEL	DELTA T2M FROM BOBWT	ROTOR REFERENCE	MANU1220
V(1.89)	OTBMTD	ACCEL	DELTA T2M FROM BOBWT	ROTOR REFERENCE	MANU1230
V(1.91)	XXD	VELOCITY	X-COMPONENT	FIXED REFERENCE	MANU1240
V(1.91)	YYD	VELOCITY	Y-COMPONENT	FIXED REFERENCE	MANU1250
V(1.92)	ZZD	VELOCITY	Z-COMPONENT	FIXED REFERENCE	MANU1260


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IF (NVAR5.NE.0) GO TO 299
QBRATF=0.
ICAN=0
I=1
IND=1
LINK=5
SG=1.
DO 297 N=1,2
  NPSIN=NPSIN(N)
  IF (NPSIN.EQ.0) GO TO 297
  CALL ROTAN (N)
  ZLD(1,N)=FLAP12,N)*SG
  ZLD(2,N)=HALFPI
  ZLD(3,N)=TAN(OLD(1,N))
  ZLD(4,N)=(COS(BETA2(N))-OLD(1,N))*00201(SG*ORDR(N)-ARD)/
    (COS(OLD(1,N))*002-PSID(N)*TAN(FLAP11,N))
  SG=-SG
  L=70N
DO 296 K=1,NPSIN
  L=L+1
  V(1,L+1)=BETA1K(N)
  V(1,L+2)=BETA2K(N)
  V(1,L+85)=BETA2D(K,N)
296 CONTINUE
297 CONTINUE
  IND=0
  LINK=4
DO 294 DELT=5,50*DELT
  ZDEL1=1./DELT
  ZDEL2=2.*DELT
  IF (ZCTP.FO.0) GO TO 210
295 CONTINUE
  NVARS=0
  IF (TIME.ULT.TMAX) GO TO 300
  VT=TIME*(Tao)

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GO TO (9060,9061,11). KCTR
9050 TOELT=ZDELTY
TMAX=ZMAX2
NMAG=C

IF (WABE.EQ.2) NMAG=1
GO TO 298

9061 TOELT=ZDELTY
TMAX=ZMAX3
NMAG=C
GO TO 298

C 0000 0000 TIME LOOP 0000 0000
C 0000 0000 0000 0000

210 CONTINUE

IF (V(1,7).GE.TWOP1) V(1,7)=V(1,7)-TWOP1
IF (V(1,8).GE.TWOP1) V(1,8)=V(1,8)-TWOP1
OTZM=RETAE(1)*PCC(1)
OTZ1=RETAE(2)*PCC(2)
DO 212 N=1,2
RETAD(N)=0.

BETA(N)=RETAE(N)*RETAE(N)
IF (PST(N).EQ.0) GO TO 212
IF (N.EQ.1) GO TO 208

AVM=AYBMT
APBM=APBMT
ARB=ARBMT
GO TO 207

208 CONTINUE

AVB=C.
APBM=ZETA
ARB=C.

207 CONTINUE

CALL RATS (ARD,APD,AYD,AVM,APBM,ARB,ARM,APDM,AYDM,-1)

RET1=V(1,7)*W+11-BETA2(N)
BETA2=V(1,7)*W+12-BETA2(N)

TANB1=TAN(BETA1)
TANB2=TAN(BETA2)

DPS12=DPS1(2,N)
SIND2=SINDPS12(N)

SIN1=SIN(V(1,N)*61)
COS1=COS(V(1,N)*61)

RET1D=V(1,7)*W+25
BETA2D=V(1,7)*W+26

IF (ABS(SIND2).GT..0001) GO TO 209
RET2=OLD(1,N)

DPS12=DPS1(2,N)
TANB2=OLD(3,N)

BETA2D=OLD(4,N)
SIND2=SINDPS12(N)

IF (PSID(N).NE.C.) GO TO 209
TAN1=C.

TANB1=C.

IF (COS1.GE..707) TAN1=-TANB1/COS1
IF (COS1.LT..707) TAN1=-TANB1/SIN1

APDR(N)=BETA1D*COS1*APDM

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MANU2160

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      ARD(N)=BETA1D*SIM(N)*ARDN
      GO TO 211
209 CONTINUE
      SIN2=SIM(Y1,N*6)*DPS12N)
      COS2=COS(Y1,N*6)*DPS12N)
      TAN1=(SIM1*TANB12-SIN2*TANB11)/SINB2
      TAN1=(COS2*TANB11-COS1*TANB12)/SINB2
      FLAP11(N)=ATAN(TAN1)
      FLAP12(N)=ATAN(TANB1)
      C1=9BETA1D/ICOS(BETA11)*02
      C2=9BETA2D/ICOS(BETA21)*02
      PFAC=C1*SIM2-C2*SIM1/SINB2
      PFAC=C2*COS1-C1*COS2/SINB2
      COS1=COS(FLAP12,N)
      APD(N)=APD0*(COS1*FLAP11,N))1002*(COSB1)*(PFAC-PS10(N)*TANB1)
      APD(N)=APD0*(COS1*002)*PFAC*PS1(N)*TANB1)
211 CONTINUE
      OLO11(N)=BETA1
      OLO12(N)=PS1AFF(N)
      OLO13(N)=TANB1
      OLO14(N)=BETA1D
212 CONTINUE
      BITR=-BITR
      ARTD=-ARTD
      AV1=AV
      TMRGT11)=TMP
      TMRGT12)=TTR
      ZFLW11)=ZFLWG
      ZFRWG1)=ZFRWG
      AZETA=C
      AZETAAT=C
      VZETA=C
      VZETAAT=C
      IF(ISTOP.NE.1) 1STOP=0
      CALL INIT
      DBRAKE=C
      TIME=TIME+TDELT
      DIST=DIST+VOTDELT
      GO 66 N=1.2
      IF(EMPTIM).EQ.0.1 GO TO 64
      PSDS01=PS1D(N)*002*AIRIN)
      MURK(N,1)=MURKS11,N)*PSDS01
      MURK(N,2)=MURKS12,N)*PSDS01
66 CONTINUE
      IF(ETSTAR11).GT.TIME) GO TO 208
      VABS=1
      I=1
      GO TO 450
      ****ORUNGE-KUTTA****
35 I=2
36 GO TO 11.290.420.400.1
37 DELT=DELT

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DELT2=DELT2
JUAN1=DELT1
30 TO 420
400 DELT2=DELT2
DELT2=DELT2
QUAN1=DELT2
420 70 440 K=1.75
V(I,K)=V(I,K)+Y(I-(K+75)*DELT2
440 CONTINUE
450 VXB=Y(I,1)
VYB=Y(I,2)
VZB=Y(I,3)
AYB=Y(I,4)
APB=Y(I,5)
PSIRFF(I)=Y(I,7)
PSIREF(I)=Y(I,8)
PSD=Y(I,9)
PSD=PSD*GEFARAT
AYE=Y(I,10)
APE=Y(I,11)
ARE=Y(I,12)
IF(Y(I,13)-LT.C.) Y(I,13)=C.
OTBWT=Y(I,13)
XX=Y(I,15)
YY=Y(I,16)
ZZ=Y(I,17)
N=214 N=1,2
VPSIN=NPST(N)
IF(NPSIN.EQ.C.) GO TO 214
N=213 K=1,NPSIN
RETA(K,N)=Y(I,7+N*K+10)
RETAD(K,N)=Y(I,7+N*K+24)
213 CONTINUE
214 CONTINUE
PSD=PSD*PSN550
CALL PATS(VXB,VYB,VZB,AYE,APE,ARE,XXD,YYD,ZZD,1)
VHSO=XXD**2+YYD**2
VM=SQRT(VHSO)
V=SQRT(VHSO+ZZD**2)
AVE=C.
AYFP=C.
APFP=C.
IF(VX9.NE.0.0.OR.VY9.NE.0.0) AY=ATAN2(YYD,XXD)
IF(VH.NE.C.) AYFP=ATAN2(YYD,XXD)
IF(V.NE.0.) APFP=ATAN2(-ZZD,VH)
IF(VARS.NE.C.) RETURN
IF(1.EQ.3.OR.IND.EQ.1) GO TO 225
*** VARIATIONS DUE TO INPUTS ***
CALL VAPT
IF(FXIT.NE.C.) GO TO 1
CALL SWAS (COLSTR)

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TIMT=TIM+DT1(1)
TZMT=TZM+DT2(1)
T1TT=T1T+DT1(2)
T2TT=T2T+DT2(2)
CALL PCG (PSD,DTZMT,1)
DTZ=DTZMT+ASECOL
TZM=TZM+DTZM1+DTZ
T2T=T2T+DTZT1+DTZ+TRIND
225 ORM=PSD*PM
      ORT=PSD*TR
TZMT=TZM+DTBWY
T2TT=T2T+DTBWT+TRIND
ZZTR=TRALT-ZZ+TRIND
      CALL ANAL
      IF(EXIT.NE.C.) GO TO 1
      QMR=QMR+QTR+GEARAT
      QMR = TORQUE FROM AIRLOAD DRAG
      QMAX = MAXIMUM TORQUE AVAILABLE
      QMS = TORQUE SUPPLIED
      QMRSA = TORQUE AVAILABLE, LIMITED BY ENG. ACCEL. SCHED.
      IF (OPC .EQ. 10.) GO TO 315
      IF (QMR.EQ.1.) GO TO 306
      IF (QMR.NE.2.) GO TO 303
      QMRSA=QMR
      GO TO 315
304 IF(QMRSA.GE.QMAX) GO TO 308
      IF(GOV.LT.0.0) GO TO 315
      IF(GOV.NE.0.) GO TO 305
      QMRSA=QMAX
      GO TO 308
305 IF(1.EQ.3-OR.IND.EQ.1) GO TO 308
      TGOV=TDLT/GOV
      QMRSA=QMRSA+(SORT(QMRSA*QMAX)+.25*TGOV*QMAX)*TGOV
      IF QMRSA.GT.QMAX)QMRSA=QMAX
308 QUAD=Y(1-1, 9)
      IF(1.EQ.3)QUAD=Y(1, 9)
      QMRSA=QMR+ITORS*(INMEGM-QUAD)*QIAO1
315 QMRSA=XDELIM(C.,QMRSA,OMPS)
303 CONTINUE
      IF(BRAKE.NE.C.) GO TO 322
      IF(PSD.FO.C.) GO TO 323
      OPSTOP=PSISTP-PSIREF(1)
      IF(PSD .LT. (-PSD*TDLT)) GO TO 325
      IF(OPSTOP.GE.(PSD*TDLT)) GO TO 321
300 CONTINUE
      OPSTOP=OPSTOP+DPSI(2,1)
      IF(1CAN.EQ.1.AND.OPSTOP.GT.DSTOP1) GO TO 325
      IF(OPSTOP.LT.0.) GO TO 320
321 CONTINUE
      BRAKE=ITORS*PSD**2/(OPSTOP+DPSTOP1)-QMR
      IF(1CAN.NE.C.OP.DPSTOP.GE.FOURPT) QBRAKE=AMINI(OBRAKE,QBRAK)
      IF(QBRAKE.GT.QMRSAK) GO TO 320

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QMR=QMR+QBRAKE
IF(OPSSTOP.LT.DPSI(2,1).AND.QBRAKE.LT.OXBRAK) ICAN=1
IF(ICAN.EQ.1) DSTOPI=OPSSTOP+.1
IF(OPSSTOP.GT.PSD+TDELT) GO TO 322
325 CONTINUE
OPSTP=PSISTP-PSIREF(1)
PSIREF(1)=PSISTP
PSIREF(2)=PSIREF(2)+OPSTP*GEARAT
DO 324 K=1,4
V(K,7)=PSISTP
V(K,8)=PSIREF(2)
V(K,9)=0.
V(K,82)=0.
V(K,83)=0.
V(K,84)=0.
ISTOP=1
324 CONTINUE
GO TO 323
322 CONTINUE
V(1,84)=(QMR-QBR)*RITORS
323 CONTINUE
LP=QL-APD*(AYD+DIZIY-ARD*IXZ)
MP=QN-APD*(ARD+D(VIX+AYD*IXZ))
V(1,76)=XFORMASS-APD*VZB+AYD*VVB
V(1,77)=XFORMASS-AYD*VXB+ARD*VZB
V(1,78)=XFORMASS-ARD*VVB+APD*VXB
AYDD=LP*OPPIZ+MP*OPPIX
APDD=(QN-AYD*ARD+DIXZ*(AYD+ARD)*(AYD-ARD)*IXZ)*RIY
ARDD=LP*OPPIZ+MP*OPPIX
V(1,79)=AYDD
V(1,80)=APDD
V(1,81)=ARDD
V(1,82)=V(1,9)
V(1,83)=V(1,9)*GEARAT
CAPE=COS(APE)
SARE=SIN(AAE)
CARE=COS(AAE)
IF(ABS(CAPE).LT.0.001) GO TO 1
V(1,85)=(APD+SARE+AYD*CARE)/CAPE
V(1,86)=APD*CARE-AYD*SARE
V(1,87)=ARD*(V(1,85)*SIN(APE)
V(1,88)=V(1,14)
BMTDO=BMT*(GVERT-GPREL)-BMT*V(1,14)-BMT*DTBMT
IF(DTBT.GT.0..OR.BMTDO.GE.0.) GO TO 668
V(1,13)=0.
V(1,14)=0.
V(1,88)=0.
V(1,89)=0.
BMTDO=0.
668 V(1,89)=BMTDO
V(1,90)=XXD
V(1,91)=YYD
V(1,92)=ZZD
PSDD=V(1,84)

```

```

MANU3790
MANU3800
MANU3810
MANU3820
MANU3830
MANU3840
MANU3850
MANU3860
MANU3870
MANU3880
MANU3890
MANU3900
MANU3910
MANU3920
MANU3930
MANU3940
MANU3950
MANU3960
MANU3970
MANU3980
MANU3990
MANU4000
MANU4010
MANU4020
MANU4030
MANU4040
MANU4050
MANU4060
MANU4070
MANU4080
MANU4090
MANU4100
MANU4110
MANU4120
MANU4130
MANU4140
MANU4150
MANU4160
MANU4170
MANU4180
MANU4190
MANU4200
MANU4210
MANU4220
MANU4230
MANU4240
MANU4250
MANU4260
MANU4270
MANU4280
MANU4290
MANU4300
MANU4310
MANU4320

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MANU4330
MANU4340
MANU4350
MANU4360
MANU4370
MANU4380
MANU4390
MANU4400
MANU4410
MANU4420
MANU4430
MANU4440
MANU4450
MANU4460
MANU4470
MANU4480
MANU4490
MANU4500
MANU4510
MANU4520
MANU4530
MANU4540
MANU4550
MANU4560
MANU4570
MANU4580
MANU4590
MANU4600
MANU4610

```

DO 671 N=1,2
NPSIN=NPSI(N)
IF(NPSIN-EO,0) GO TO 671
DO 670 K=1,NPSIN
Y(I,7*N+K+10)=BETA(K,N)
Y(I,7*N+K+24)=BETAD(K,N)
Y(I,7*N+K+85)=BETAD(K,N)
670 CONTINUE
671 CONTINUE
IF(IND.NE.0) GO TO 500
I=I+1
IF(I.LE.4) GO TO 355
DO 490 I=1,75
K=I+75
Y(4,K)=(Y(1,K)+2.*(Y(2,K)+Y(3,K))+Y(4,K))*0.1666667
490 Y(4,I)=Y(1,I)+TDELT*Y(4,K)
IND=1
I=4
50 TO 450
500 DO 495 I=1,150
495 Y(1,I)=Y(4,I)
I=I+TDELT
IND=0
I=1
GO TO 210
1 A4=99999999.
WRITE (3) IPSN,A4,A
RETURN
END

```

MATR0010
 MATR0020
 MATR0030
 MATR0040
 MATR0050
 MATR0060
 MATR0070
 MATR0080
 MATR0090
 MATR0100
 MATR0110
 MATR0120
 MATR0130
 MATR0140
 MATR0150
 MATR0160
 MATR0170
 MATR0180
 MATR0190
 MATR0200
 MATR0210
 MATR0220
 MATR0230
 MATR0240
 MATR0250
 MATR0260

SUBROUTINE MATRIX (A1,A2,A3,A,N1)
 DIMENSION A(9)
 COMPUTE EULER ANGLE MATRIX A FROM EULER ANGLES A1,A2,A3
 N1=1 IS FOR USUAL MATRIX
 N1=-1 IS FOR INVERSE OF USUAL MATRIX
 SA1=SIN(A1)
 SA2=SIN(A2)
 SA3=SIN(A3)
 CA1=COS(A1)
 CA2=COS(A2)
 CA3=COS(A3)
 SIC3=SA1*CA3
 SIS3=SA1*SA3
 CIC3=CA1*CA3
 CIS3=CA1*SA3
 A(1)=CA1*CA2
 A(3-N1)=CIS3*SA2-SIC3
 A(5-2*N1)=CIC3*SA2+SIS3
 A(3+N1)=SA1*CA2
 A(5)=SIS3*SA2+CIC3
 A(7+N1)=CA2*SA3
 A(5+2*N1)=-SA2
 A(7-N1)=SIC3*SA2-CIS3
 A(9)=CA2*CA3
 RETURN
 FND

C
 C
 C

```

TWO DIMENSIONAL VECTOR TRANSFORMATION
N1=1 IS FOR USUAL
N1=-1 IS FOR INVERSE
SUBROUTINE MICE (X1,Y1,A,X2,Y2,N1)
S=SIN(A)*N1
C=COS(A)
X2=X1+C-Y1*S
Y2=X1*S+Y1*C
RETURN
END

```

```

MICE0010
MICE0020
MICE0030
MICE0040
MICE0050
MICE0060
MICE0070
MICE0080
MICE0090
MICE0100

```

```

C C C

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[illegible]

3	ALCVP,ALFIN,ALLWG,ALRWG,CDELE,COFIN,	NNEND550
4	COLWG,COMWG,CLELE,CLFIN,CLLWG,CLRWG,CMING,	NNEND560
5	CYCR1,CYCR2,CZETA,CZET6,CZET9,RANGE,	NNEND570
5	SZET5,SZET7,SZETA,MGCOL,XAELE,XAFIN,	NNEND580
7	XAFUS,XAJET,YAFIN,ZAELE,ZAFIN,ZAFUS,	NNEND590
8	YAELE,YAFUS,YALWG,YARWG,YALJET,YARJET,	NNEND600
8	ZAJET,ALECR1,ALGFPP,BOTTOM,CZET11,	NNEND610
9	CZET12,CZET13,EIZETA,HALFPI,SZET10,	NNEND620
A	XAPYLD,YGUSTW,ZAPYLD,ZFLWGL,ZFRWGL	NNEND630
A	YZMS,TIMS,TMS,TZTS,TZTS,TZTS,	NNEND640
C	CLOCK,FLOCK,XLOCK,TCLOCK	NNEND650
	COMMON /ROMAN/	NNEND660
1	ZZ,VXS(2),VYS(2),VZS(2),BETA(12,2),	NNEND670
1	T,PCC(2),COSEL(7,2),BETAM(2),BETAK(2),BETAZ(2),	NNEND680
1	AIB(2),APDD,ARDD,AYDD,AIA(2),	NNEND690
2	DPS(112,2),DTPR,NPS(12),ZZTR,	NNEND700
3	BETAD(12,2),BNPS(12),	NNEND710
4	COND2,GMAXV,RATE1,RATE2,STOP2,	NNEND720
4	THROT(2),TRIND,XGUST,BETAZD(2),GMAXV1,	NNEND730
5	GMAXV2,GMAXV3,GUSTYP,MNPSIR(2),	NNEND740
6	MURKPS,MURKRS,MUBTSP,MUBTAS,	NNEND750
7	KONFIG,LNGTH1,PILGH1,PSIREF(2),	NNEND760
8	STAPT2,XMOML(112,2),	NNEND770
9	RM,RT,ORM,ORT,TLMT,TLTT,	NNEND780
A	TZMT,TZTT,TZMT,TZTT,XMAL,XMALT,	NNEND790
R	XMB1,XMBIT,AIRPM,AIBPT,AIBPM,ATORT,	NNEND800
C	APTD,APTDD,ARTD,ARTDD,PSD,PSDT,	NNEND810
D	XSTAM,XSTANT,YSTAM,YSTANT,	NNEND820
E	MURKP,MURKTP,MURKR,MURKTR	NNEND830
	COMMON /MANAROT/	NNEND840
1	LV,IND,MWAG,APRMT,ARRMT,AYBMT,BETA0(2),TDELT,	NNEND850
2	BETA(2),MGUSTE,MGUSTF,MGUSTM,VGUSTE,	NNEND860
3	VGUSTM,VGUSTF,GFWD,GLAT,GVERT,	NNEND870
4	VXB,VXB,APD,VYR,APD,AYD,	NNEND880
5	COLSTR,CYSTK1,CYSTK2,PEDAL,AYE,	NNEND890
6	APC,ARE,AIM,AIM,ALTP,BITA,	NNEND900
7	XAR(2),YAR(2),ZAR(2),	NNEND910
8	VIMR,VITP,ZFTA,ZFTATR,MHR,MTR,	NNEND920
	COMMON /STANPO/	NNEND930
1	J,M,ITM,VMS(2),L(MK,OFLE,VROT(2),	NNEND940
2	VSND,VF(N(2),ZFEL(2),AIBAL(2),	NNEND950
3	ALVAL(2),COND1,SWING,PILGH2,PMGELL,	NNEND960
	COMMON /ROSTAR/	NNEND970
1	AM(2),CT,PI,XB(2),ALT,ADR(2),FXM(2),	NNEND980
2	VXR(2),RBM(2),SWC(2),UMS,CDMR(2),LROT(2),	NNEND990
3	ZAIR(2),RTRP(2),TAIR(14),CONER(2),DCAFR(2),FVIND,	NNEND1000
4	NVARO,	NNEND1010
5	SWKR(2),SWKR2(2),TIPIB(2),TIPIB(2),	NNEND1020
6	THWIST(2),CLRADK(2),DELTA1(2),	NNEND1030
7	LAMDA(2),UPGUST,URGUST,UTGUST,MROTOR,	NNEND1040
8	ERM,ERTX,ERM,ERT,	NNEND1050
9	KLMAX,XLMAX,XLMIN,XLMINT	NNEND1060
	COMMON /TOPLOT/	NNEND1070
1	AM(3),AL(3),EXIT,ICM(49),IPSN,	NNEND1080
1	NPART,NVARA,NVARA,NVARC,NSCALE	NNEND1090
1	NVAPS,NPR(NT,NTIME)	NNEND1090

```

COMMON /STARAN/ RH(2),C3,C4,PM,CIP,CLR,DCD,DOL,DON,VIM,
  RAIR(2),CLRN,CNBN,ETAO,NJET,
  OFIN,
  VIER,CLACL,YE(114),
  CNBCL,CNPCL,CNPDN,CNACL,COLKS,D3FLF,
  FNSWC,LWING,PMREL,PMRWG,
  PTRFN,APIST,VMAXE,VAERO(31,5),
  APBJET,APBJET,AVRJET,
  CNPCOI,CNPD2,COLJET,DXWGEL,DZWGEL,
  ETAOMX,PMGSKI,RCWING,SWINGH,
  VENTER,VMTVFR
COMMON /FORV/ V(4,150)
PEAL IX,IY,IZ,IXZ-MASS,ITORS,ILJET,LBJET,MLJET,MRJET,NLJET,NRJET
DIMENSION FOR(171)
EQUIVALENCE (XF,FOR(1))
NVARC=0
IF(NVARC.NE.2) GO TO 102
NVARC=1
NVARC=0
GO TO 100
102 CONTINUE
IF(NVARC.NE.0) NVARC=1
100 CONTINUE
TRIND2=1-TRIND
CALL TINIT (TAIR)
ALEL=0.
ALFIN=0.
ALLWG=0.
AIRWG=0.
APD=0.
APDD=0.
APBJET=0.
ARDD=0.
AYD=0.
AYDD=0.
BETA(1)=0.
BETA(2)=0.
BETAC(1)=0.
BETAC(2)=0.
COLWG = 0.
COWG = 0.
CDELE = 0.
CDFIN = 0.
CLLWG = 0.
CLWGS = 0.
CLELE = 0.
CLFIN = 0.
DOL=0.
DON=0.
ETAO=0.
EXIT=0.
GUSTYP=0.
HGUSTE=0.
NNEM1090
NNEM1100
NNEM1110
NNEM1120
NNEM1130
NNEM1140
NNEM1150
NNEM1160
NNEM1170
NNEM1180
NNEM1190
NNEM1200
NNEM1210
NNEM1220
NNEM1230
NNEM1240
NNEM1250
NNEM1260
NNEM1270
NNEM1280
NNEM1290
NNEM1300
NNEM1310
NNEM1320
NNEM1330
NNEM1340
NNEM1350
NNEM1360
NNEM1370
NNEM1380
NNEM1390
NNEM1400
NNEM1410
NNEM1420
NNEM1430
NNEM1440
NNEM1450
NNEM1460
NNEM1470
NNEM1480
NNEM1490
NNEM1500
NNEM1510
NNEM1520
NNEM1530
NNEM1540
NNEM1550
NNEM1560
NNEM1570
NNEM1580
NNEM1590
NNEM1600
NNEM1610
NNEM1620

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```

      UGUSTF=0.
      UGUSTW=0.
      UMR=0.
      UTR=0.
      INQ=1
      VMAG=0
      PSD=0.
      QMX=0.
      QTR=0.
      SWC(1)=1.
      UPGUST=0.
      UTGUST=0.
      URGUST=0.
      VGUSTF=0.
      VGUSTW=0.
      VIER=0.
      VIN=0.
      XMA1=0.
      XMB1=0.
      XMAIT=0.
      XMBIT=0.
      YGUSTF=0.
      YGUSTW=0.
      YMR=0.
      YTR=0.
      PSD550=PSD*550
      DO 307 I=1,71
      FOR(I)=0.
307 CONTINUE
      DO 308 J=1,150
      DO 308 I=1,4
      Y(I,J)=0.
308 CONTINUE
      CALL NOPSII (NPSI,MNPSIR,MNPSI,DPSI)
      DIZIV=IZ-IV
      DIXIZ=IX-IZ
      DIVIX=IV-IX

      SET UP CURVE FOR EFFECT OF MAIN ROTOR WAKE ON THE ELEVATOR.
      THIS CURVE CAN BE REPRESENTED BY THREE STRAIGHT LINES - ZERO
      BEFORE THE VELOCITY IS GREAT ENOUGH TO CAUSE AN EFFECT ON
      THE ELEVATOR, VENTER; A LINE WITH CONSTANT SLOPE FROM VENTER
      TO A VELOCITY WHICH PRODUCES A MAXIMUM EFFECT, VMAXE; AND A
      CONSTANT AT VMAXE AND GREATER.

      VXMVER=PMREL
      IF(VMAXE.NE.VENTER) VXMVER=PMREL/(VMAXE-VENTER)
      IF(XLMIN.LE.0..OR.XLMINM.GT.DTR) XLMIN=.3490659E-02
      IF(XLMINT.LE.0..OR.XLMINT.GT.DTR) XLMINT=.3490659E-02
      IF(ERXM.LT.750.) ERXM=750.
      IF(ERT.LT.750.) ERT=750.
      XLMAXM=8.*XLMINM
      XLMAXT=8.*XLMINT
      IF(XMIN.LT..8726645E-03) XMIN=0TR

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```

MNM1630
MNM1640
MNM1650
MNM1660
MNM1670
MNM1680
MNM1690
MNM1700
MNM1710
MNM1720
MNM1730
MNM1740
MNM1750
MNM1760
MNM1770
MNM1780
MNM1790
MNM1800
MNM1810
MNM1820
MNM1830
MNM1840
MNM1850
MNM1860
MNM1870
MNM1880
MNM1890
MNM1900
MNM1910
MNM1920
MNM1930
MNM1940
MNM1950
MNM1960
MNM1970
MNM1980
MNM1990
MNM2000
MNM2010
MNM2020
MNM2030
MNM2040
MNM2050
MNM2060
MNM2070
MNM2080
MNM2090
MNM2100
MNM2110
MNM2120
MNM2130
MNM2140
MNM2150
MNM2160

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IF(XMIN.GT.DTR) XMIN=DTR
IF(XL(MIT.LT.1.5*OTR).OR.XL(MIT.GT..1745329) XL(MIT=OTR
IF(DAMP.LT.(40.*ERR(1))) DAMP=40.*ERR(1)
VAR(1)=VARSP(1)
VALWG=-VARWG
VALJET=-VARJET
IF(TRIND.NE.C..AND.ABS(XARSP(1)-XARSP(2)).LE.5.) TRIND=1.
KONFIG=1.+TRIND*TRIND
CALL COM2 (XCON,XLWK,KONFIG,RUD(ND)
RC=0.
IF(XMR(14).NE.0.) RC=AM(1)/W
IF(KONFIG.EQ.3) RC=PC*2.*DM
CALL TILT1 (KONFIG)
CALL TILT (XAR,ZAR,CGL,COLL,ZETA,CSTA)
CALL TFEA (XAR,BETAZ,CSTA)
CALL HSAF (XAR,YAR,DPSI,MPSI,CGSTA,PSIREF)
XAR(2)=XARSP(2)*HL(2)*SIN(ZETA)
CZTR=COS(ZETA)
HLTR1=HL(2)*TRIND
VAR(2)=VARSP(2)-HLTR1*CZTR
ZAR(2)=ZARSP(2)-HLTR1*CZTR
CALL RATS (XXD,VYD,ZZD,AVE,AFE,ARE,VXB,VYB,VZB,-1)
V=SQRT(XXD**2+VYD**2+ZZD**2)
CALL TURN (XFC,V,ARE)
WROTDR=1350.*TRIND
RW=1./W
MASS= W/32.17
IF(EPDS.EQ.0.) EPDS=.3
ARWING=YMG(1R)
IF(ARWING.EQ.0.) ARWING=1.
SWING=SQRT(XMG(1)*ARWING)
CWMG=SWING/ARWING
RCWMG = 0.
IF(CWMG.NE.0.) *CWMG = 1./CWMG
CAGW=COS(AGW)
CMG6=.6*CWMG
YAER(19,3)=YAER(13,3)/YAER(17,3)
*PIST=.35*CAGW/(HALFPI-YAER(19,3))
DXMGL=XAG-XAELE+CMG6*CAGW
DZMGL=ZAG-ZAELE+SIN(AGW)*CMG6
SWINGM=.5*SWING
CNPCD1=CNPCD*YAER(13,3)
CNPCD2=CNPCD*2.*YAER(14,3)*ARWING/13.*ARWING

IF THERE ARE NO JETS CALCULATE FORCES AND MOMENTS AND USE THE
VALUE OF COLJET TO PREVENT FURTHER CALCULATIONS LATER IN THE
PROGRAM

IF(INJET.EQ.0) COLJET=C.
CALL PATS(TAXL,0.,0.,-AYRJET,APBJET,APBJET,XFLJET,VFLJET,ZFLJET,1)
CALL DOGS (XAJET,VALJET,ZAJET,XFLJET,VFLJET,ZFLJET,LLJET,MLJET,
1 MLJET)
CALL RATS (TAXR,0.,0.,-AYBJET,APBJET,APBJET,XFRJET,VFRJET,ZFRJET,1)
CALL DOGS (XAJET,VARJET,ZAJET,XFRJET,VFRJET,ZFRJET,LRJET,MRJET,

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MMEM2170
MMEM2180
MMEM2190
MMEM2200
MMEM2210
MMEM2220
MMEM2230
MMEM2240
MMEM2250
MMEM2260
MMEM2270
MMEM2280
MMEM2290
MMEM2300
MMEM2310
MMEM2320
MMEM2330
MMEM2340
MMEM2350
MMEM2360
MMEM2370
MMEM2380
MMEM2390
MMEM2400
MMEM2410
MMEM2420
MMEM2430
MMEM2440
MMEM2450
MMEM2460
MMEM2470
MMEM2480
MMEM2490
MMEM2500
MMEM2510
MMEM2520
MMEM2530
MMEM2540
MMEM2550
MMEM2560
MMEM2570
MMEM2580
MMEM2590
MMEM2600
MMEM2610
MMEM2620
MMEM2630
MMEM2640
MMEM2650
MMEM2660
MMEM2670
MMEM2680
MMEM2690
MMEM2700

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MNUM2710
 MNUM2720
 MNUM2730
 MNUM2740
 MNUM2750
 MNUM2760
 MNUM2770
 MNUM2780
 MNUM2790
 MNUM2800
 MNUM2810
 MNUM2820
 MNUM2830
 MNUM2840
 MNUM2850
 MNUM2860
 MNUM2870
 MNUM2880
 MNUM2890
 MNUM2900
 MNUM2910
 MNUM2920
 MNUM2930
 MNUM2940
 MNUM2950
 MNUM2960
 MNUM2970
 MNUM2980
 MNUM2990
 MNUM3000
 MNUM3010
 MNUM3020
 MNUM3030
 MNUM3040
 MNUM3050
 MNUM3060
 MNUM3070
 MNUM3080
 MNUM3090
 MNUM3100
 MNUM3110
 MNUM3120
 MNUM3130
 MNUM3140
 MNUM3150
 MNUM3160
 MNUM3170
 MNUM3180
 MNUM3190
 MNUM3200
 MNUM3210
 MNUM3220
 MNUM3230
 MNUM3240

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1  NRJET)
  AYBMT=ZETATR*TRIND2
  APBMT=-ZETATR*TRIND
  ARBMT=HALFP*TRIND2
  ZZTR=TRALT-ZZ*TRIND
  CYCR1=CYSK1*CYCF(3)+CYCF(2)
  CYCR2=CYSK2*CYCL(3)+CYCL(2)
  PED=PEDAL*PEDA(3)+PEDA(2)
  COLKS=COLSTK
  CALL SMAS1 (KONFIG)
  CALL SMAS (COLSTK)
  IF(GUESS.EQ.2) GO TO 58

  ORIGINATE GUESS FOR THRUST AND FLAPPING.

  XFVG = 0.
  ZFVG = 0.
  IF(LONG.LT.0) GO TO 51
  AP=0.
  IF(VXB.NE.0.0.OR .VZB.NE.0.) AP=ATAN2(VZB.VXB)
  ALWG=AGW*AP
  XMAC=VGVSMO
  CALL CLCD (ALWG,CL,CD,XMAC,EXIT,3)
  IF(EXIT.NE.0.) RETURN
  CALL MICE (CD,CL,AP,CL,C2,1)
  VONG = 2.0*VGVQMG
  ZFVG = VONG*C2
  XFVG = VONG*C1
  51 CALL RATS (0.0,0.0,W,AVE,AP,ARE,XFM,VFM,ZFM,-1)
  DF=QGVV*(VFS(7)+1.)*XFVG
  TMR=((ZFV*ZFVG)*CZET*OF*SZET)*((1.-.5*TRIND)
  TTR=125.*TMR*TRIND2*TR*TRIND
  IF(GUESS.NE.0.) GO TO 58
  IF(ORH.GT.RH) GO TO 52
  WRITE(6,53)
  EXIT = 1.
  RETURN

52 CONTINUE
  ALFI=APE-APFP
  THM=TZM-TWIST(30NMR(1)/4,1)
  ALF=ZETA+TIN-ALF1
  XMU=V/ORMCOS(ALF)
  XL4=V/ORMSIN(ALF)
  A1M=XMU*(2.666667*THM+2.*XL4)/(1.-.5*XMU**2)-TIM
  B1M=T2M
  TMT=T2T-TWIST(30NMR(2)/4,2)
  ALF=ZETATR+T1T-ALF1*TRIND-(AVE-APFP)*TRIND2
  XMU=V/ORMCOS(ALF)
  XL4=V/ORMSIN(ALF)
  A1TR=XMU*(2.666667*THMT+2.*XL4)/(1.-.5*XMU**2)-T1T
  B1TR=T2T
  58 CONTINUE
  VIMR = 0.
  V1TR = 0.
  
```

C C C

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IF(RM.FQ.O.) TMR=O.
IF(ATP.FQ.O.) TTR=O.
IF(TMR.FQ.O..OR.ORM.LE.RM) GO TO 59
ALT=-ZZ
CALL RATS (VXB,VVR,VZB,C...-ZETA,C...VXS(1),VVS(1),VZS(1),-1)
VROT(1)=V
VHS=VXS(1)*2+VVS(1)*2
CT=TMPORTRP(1)
CALL VIND (1.EXIT)
CALL RATS (VXB,VVB,VZB,VYB,MYBMT,APRMT,ARMT,VXS(2),VVS(2),VZS(2),-1)
ALT=ZZTR
VROT(2)=V
VHS=VXS(2)*2+VVS(2)*2
CT=TMPORTRP(2)
CALL VIND (2.EXIT)
59 CONTINUE
V(1,9)=XRD
V(1,9)=VVD
V(1,9)=ZZO
RATB(2)=RATB(2)*GEARAT
IF(PSO.NE.O.) GO TO 73
DO 72 N=1,2
  BETAN(N)=BETAZ(N)
  METAX(N)=BETAZ(N)
72 CONTINUE
XFC(23)=Z.
AIM=O.
AIM=O.
AITR=O.
BITR=O.
GO TO 67
73 CONTINUE
IF(XFC(23).NE.1.) GO TO 66
IPAKF=O
PSO=O.
PSDT=O.
67 CONTINUE
NPST(1)=BM
NPST(2)=BTR
ITM=O
64 CONTINUE
LINK=1
PSISTP=O.
IF(NPART.NE.2) GO TO 109
WRITE (6,198)
IF(NVAR.NE.O) GO TO 103
WRITE (6,104)
GO TO 105
103 WRITE (6,104) NVAR
105 WRITE (6,107) TZERO,ZDELT1,TMAX,ZDELT2,ZMAX2,ZMAX3
CALL IVAR (EXIT,LINK,TAXL,TARR,PILGM2,AIM,BIM,AITR,BITR)
109 CONTINUE
IF(XFC(23).NE.1.) GO TO 65
CALL NOPSII (NPST,NMPSIR,9NPST,DPSI)

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```

NNEM3250
NNEM3260
NNEM3270
NNEM3280
NNEM3290
NNEM3300
NNEM3310
NNEM3320
NNEM3330
NNEM3340
NNEM3350
NNEM3360
NNEM3370
NNEM3380
NNEM3390
NNEM3400
NNEM3410
NNEM3420
NNEM3430
NNEM3440
NNEM3450
NNEM3460
NNEM3470
NNEM3480
NNEM3490
NNEM3500
NNEM3510
NNEM3520
NNEM3530
NNEM3540
NNEM3550
NNEM3560
NNEM3570
NNEM3580
NNEM3590
NNEM3600
NNEM3610
NNEM3620
NNEM3630
NNEM3640
NNEM3650
NNEM3660
NNEM3670
NNEM3680
NNEM3690
NNEM3700
NNEM3710
NNEM3720
NNEM3730
NNEM3740
NNEM3750
NNEM3760
NNEM3770
NNEM3780

```

```

60 64 N=1.2
  0SIRFF(N)=PSISTP
  IF(KONFIG.EQ.3) GO TO 62
  4ETAN(N)=0.
  4ETAZ(N)=0.
  4ETAX(N)=0.
  IF(N.FO.2) GO TO 64
  70 61 K=1.12
  0PSIK(N)=0.
  IF(K.GT.7) GO TO 61
  70 60 L=1.7
  0COSEK(N)=1.
  60 CONTINUE
  61 CONTINUE
  GO TO 64
  62 CONTINUE
  4ETAZ(N)=-HALFPI
  4ETAN(N)=-HALFPI
  4ETAX(N)=-HALFPI
  4PSIN=NPSIIN
  70 63 K=1.NPSIN
  4ETAZ(N)=-HALFPI
  63 CONTINUE
  64 CONTINUE
  65 CONTINUE
  IF(NPART.NE.2) RETURN

  INITIALIZE VARIABLES ONLY IF A MANEUVER IS CALLED FOR.

  ITOPS=DATB(1)+MATB(2)
  IF(ITOPS.NE.0.) RTOTRS=1./ITOPS
  1WING=0
  CALL WAG1
  RMASS=1./MASS
  RTY=1./TY
  0P = IX*IZ - IYZ*IXZ
  IF(OP.EQ.0.) GO TO 70
  0PIXZ=IXZ/OP
  0PIX=IX/OP
  0PIZ=IZ/OP
  V(1,9)=PSY
  V(1,17)=ZZ
  V(1,82)=PSO
  V(1,83)=PSOT
  RETURN
  70 CONTINUE
  EXITE=1.
  4RITE (6,71)
  4ETURN

  53 FORMAT('0 FLAPPING ANGLES CANNOT BE ESTIMATED FOR A STOPPED'.
    & ' ROTOC. ')
  71 FORMAT ('0 CHECK INPUT FUSELAGE INERTIAS. THE NUMBERS INPUT ARE
    & ' PHYSICALLY IMPOSSIBLE AND CANNOT BE HANDLED BY THIS PROGRAM. ')
  100 FORMAT (1H)

```

```

MMEM3790
MMEM3800
MMEM3810
MMEM3820
MMEM3830
MMEM3840
MMEM3850
MMEM3860
MMEM3870
MMEM3880
MMEM3890
MMEM3900
MMEM3910
MMEM3920
MMEM3930
MMEM3940
MMEM3950
MMEM3960
MMEM3970
MMEM3980
MMEM3990
MMEM4000
MMEM4010
MMEM4020
MMEM4030
MMEM4040
MMEM4050
MMEM4060
MMEM4070
MMEM4080
MMEM4090
MMEM4100
MMEM4110
MMEM4120
MMEM4130
MMEM4140
MMEM4150
MMEM4160
MMEM4170
MMEM4180
MMEM4190
MMEM4200
MMEM4210
MMEM4220
MMEM4230
MMEM4240
MMEM4250
MMEM4260
MMEM4270
MMEM4280
MMEM4290
MMEM4300
MMEM4310
MMEM4320

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SUBROUTINE MODE (PD,V,IMODE)
COMMON /TRONIC/ UU(6),VV(6),TAU(22),DAMP(22),NUMRTS,GAINB,
1 INDEX,STGAIN(6),TSTAR,COELTD,SLOT(3,9)
DIMENSION PD(10,11),SLT(3,9),ISLNT(2,2)
DIMENSION HEAD(3,2,2),HEAD1(3,3,2)
DATA HEAD /'LAT CYCLIC PEDAL F/A CYCLIC COLLECTIVE ' /
DATA HEAD1/'SDE.SLP.ANG.ROLL ANGLE YAW RATE FWD. VEL. ANG.
IF ATK.PITCH ANGLE ' /
DATA ISLOT /3,4,2,1/
COLD=COELTD
WRITE (6,299)
ISLTD=0
INDEX=0
KSLTD=-2
DO 10 I=1,3
KSLTD=KSLTD+3
CALL SLTT (SLT,SLOT,KSLTD)
ISLTD=ISLTD+3
DO 9 J=1,2
JSLTE=ISLNT(J,IMODE)
CALL SLTE (PD,ISLTD,JSLTE,IMODE)
COELTD=COELTD/COLD
IF(I.EQ.1.AND.IMODE.EQ.2) COELTD=COELTD*V
CALL 'LEC (GAINB)
INDEX=INDEX+1
STGAIN(INDEX)=GAINB*COELTD/GAINB
WRITE (6,301) (HEAD1(L,I,IMODE),L=1,3),(HEAD(L,J,IMODE),L=1,3),
1 (UU(L),VV(L),L=1,3),COELTD
9 CONTINUE
CALL SLTT (SLT,SLOT,KSLTD)
10 CONTINUE
DO 669 I=19,21
IF(TAU(I).NE.0..OR.DAMP(I).NE.0.) GO TO 669
N=I
GO TO 673
669 CONTINUE
GO TO 674
673 CONTINUE
DO 668 I=N,21
DAMP(I)=DAMP(I+1)
TAU(I)=TAU(I+1)
668 CONTINUE
674 CONTINUE
WRITE (6,300) (((HEAD1(I,J,IMODE),I=1,3),(HEAD(I,K,IMODE),I=1,3),
1 (TAU(I+3*(K+2*J-3)),DAMP(I+3*(K+2*J-3)),I=1,3),
2 STGAIN(K+2*J-2),K=1,2),J=1,3),
3 (TAU(I),DAMP(I),I=19,21),GAINB,TSTAR
RETURN
299 FORMAT('H', 57X,'FREQUENCY RESPONSE',/1X,'DEPENDENT.VAR. INDEP.
1 VAR. REAL1 IMAG1 REAL2 IMAG2
2 REAL3 IMAG3 GAINB')
300 FORMAT ('ODEP. VAR. INDEP. VAR.',6X,'TAU',
1 12X,'DAMP',9X,'TAU',9X,'DAMP',12X,'TAU',
2 11X,'DAMP',5X,'STATIC GAIN'/

```

MODE0010
MODE0020
MODE0030
MODE0040
MODE0050
MODE0060
MODE0070
MODE0080
MODE0090
MODE0100
MODE0110
MODE0120
MODE0130
MODE0140
MODE0150
MODE0160
MODE0170
MODE0180
MODE0190
MODE0200
MODE0210
MODE0220
MODE0230
MODE0240
MODE0250
MODE0260
MODE0270
MODE0280
MODE0290
MODE0300
MODE0310
MODE0320
MODE0330
MODE0340
MODE0350
MODE0360
MODE0370
MODE0380
MODE0390
MODE0400
MODE0410
MODE0420
MODE0430
MODE0440
MODE0450
MODE0460
MODE0470
MODE0480
MODE0490
MODE0500
MODE0510
MODE0520
MODE0530
MODE0540

```

3      6(1H,3A4,5X,3A4,7G14.6//)
4      'OD EN O M I N A T O P'.8X.7G14.6/
5      ' ALL ROOTS, FREQUENCIES, PERIODS, AND TIME TO HALF OR
6 DOUBLF AMPLITUDE ARE IN REAL SECONDS.'/
7      ' ALL MAGNITUDES AND PHASE ANGLES HAVE BEEN DETERMINED FROM
8  ROOTS IN AIR SECONDS.'/
9      ' GAINS ARE DETERMINED FROM ROOTS IN REAL SECONDS.'/
A      ' ALL STATIC GAINS ARE IN NATURAL UNITS PER INCH OF STICK
R.'/
C      ' T* = '.G13.5)
301 FORMAT(1H,3A4,5X,3A4,7G14.6)
END
MODE0550
MODE0560
MODE0570
MODE0580
MODE0590
MODE0600
MODE0610
MODE0620
MODE0630
MODE0640
MODE0650
MODE0660

```

```

      SUPROUTINE NDSLOT (DIV1,DIV2,TSTAR,PD,SLOT,I1,KS,LS,JDSLOT,X)
      DIMENSION UNDSLOT(11,3),PD(10,11),SLOT(3,9),KS(3),LS(2)
      DO 10 I=1,3
        DIV=DIV1
        IF(I.EQ.1) DIV=DIV1
        LK=I
        DO 8 K=1,11
          UNDSLOT(K,I)=PD(KS(I),LS(LK))/DIV
          LK=LK+1
        8 CONTINUE
        J=4
        DO 9 K=1,3
          J=J+1
          UNDSLOT(J,I)=SLOT(I,J)/DIV
          UNDSLOT(J+3,I)=SLOT(I,J+3)/DIV
          JDSLOT(J+6,I)=SLOT(I,J+6)/(X*DIV)
        9 CONTINUE
        DIV=DIV*TSTAR
        10 CONTINUE
      0 RETURN
      END
NDSLOC10
NDSLOC20
NDSLOC30
NDSLOC40
NDSLOC50
NDSLOC60
NDSLOC70
NDSLOC80
NDSLOC90
NDSLOC100
NDSLOC110
NDSLOC120
NDSLOC130
NDSLOC140
NDSLOC150
NDSLOC160
NDSLOC170
NDSLOC180
NDSLOC190
NDSLOC200
NDSLOC210

```

06C05ADn
06I05ADn
06L05ADn
06M05ADn
06N05ADn
06O05ADn
06P05ADn
06Q05ADn
06R05ADn
06S05ADn
06T05ADn
06U05ADn
06V05ADn
06W05ADn
06X05ADn
06Y05ADn
06Z05ADn

... . 027 196-1-302-1
... . 028 196-1-302-1
... . 029 196-1-302-1
... . 030 196-1-302-1

[illegible]

SUBROUTINE OFFTRM		
COMMON /STRIAB/	D(21),DT(21),E(79),F(10),X(10),	OFFT0010
1	DL,DM,DN,DX,DY,DZ,IX,IY,IZ,PD(10,11),	OFFT0020
2	ETR,EPD,ERR(1C),KMI,RHQ,	OFFT0030
3	P12,SPO(6,6,3),XBW(21),XEL(14),	OFFT0040
4	XER(7),XFC(28),XFM(7),XFS(35),	OFFT0050
5	XGN(7),XIT(21),XMR(49),XTR(49),	OFFT0060
6	XWG(21),YMR(21),YTR(21),YWG(21),	OFFT0070
7	YEL(21),YFM(21),BLCG,OAMP,DEPD(10),	OFFT0080
8	EPDS,EPOX(10),MASS,OSV1,TMRS,TTAS,	OFFT0090
9	WLCG,XCON(63),XJET(14),XMIN,AYEFP,	OFFT0100
A	BETAES(2),CMPCO,OHADO,OYBOR,GUESS,	OFFT0110
B	NPASS,POPH(1C,11),STACG,TZERO,	OFFT0120
C	XMAST,DMA'AO,QOQCOL,DTRSQ,OYBDBR,	OFFT0130
D	ENGRPM,MXPASS,PSO3OP,TRINDL,XLIMIT	OFFT0140
	AY,VH,AGN,DT1(2),DT2(2),IXZ,	OFFT0150
1	QMR,XXD,YYD,ZZD,ALGF,APFP,AYFP,	OFFT0160
2	CGML,COLL(6),CYCF(3),CYCL(3),	OFFT0170
3	DIST,KCIT(20),PEDAI(3),OMAX,	OFFT0180
4	QMR,TIME,TMAX,XCIT(20,6),ALGEZ,	OFFT0190
5	ALGE1,ALGE2,CGSTA,CPWIC,DIXIZ,	OFFT0200
6	DIVIX,DIZIV,DTZMT,DTZM1,DTZT1,FTKTS,	OFFT0210
7	HUBKM(2,2),HUBKI(2,2),	OFFT0220
8	KREAO,PIU30,TSTAR(14),ZMAX2,ZMAX3,	OFFT0230
9	ASECOL,CYPWIC,GFARAT,PSO550,	OFFT0240
	PSISTP,QXPRAK,RUIND,ZDELT1,ZDELT2	OFFT0250
1	ZZ,VXS(2),VVS(2),VVS(2),BETA(12,2),	OFFT0260
2	T,PCC(2),COSF(7,7,2),BETAN(2),BETAX(2),BETAZ(2),	OFFT0270
3	ATN(2),APOD,AROD,AYOD,ATR(2),	OFFT0280
4	OPSI(12,2),OTRP,NPSI(2),ZZTR,	OFFT0290
5	BETAD(12,2),RNPSI(2),	OFFT0300
6	COMD2,GMAXV,RATE1,RATE2,STOP2,	OFFT0310
7	THROT(2),TRIND,XGUST,BETAZD(2),GMAXV1,	OFFT0320
8	GMAXV2,GMAXV3,GUSTYP,MNPSIR(2),	OFFT0330
9	HUBKPS,HUBKRS,HUBTPS,HUBTRS,	OFFT0340
A	KONFIG,LNGTH1,PILGHI,PSIREF(2),	OFFT0350
B	START2,XMOMLI(12,2),	OFFT0360
C	RM,RTR,ORM,ORT,TIME,TITT,	OFFT0370
D	TZMT,TZTT,TZMT,TZTT,XMA1,XMA1T,	OFFT0380
E	XMB1,XMR1T,AIBPM,AIBPT,AIBRM,AIBRT,	OFFT0390
F	APT,APTDO,ARTO,ARTO,PSO,PSOT,	OFFT0400
1	XSTAMM,XSTANT,YSTAMM,YSTANT,	OFFT0410
2	HUBKP,HUBKTP,HUBKR,HUBKTR	OFFT0420
3	AZETA,AZETAT,VZETA,VZETAT	OFFT0430
4	I,V,INO,MWAG,APMT,ARMT,AYGMT,BETA0(2),TDELT,	OFFT0440
5	BETA(2),MGUSTE,MGUSTF,MGUSTW,MGUSTE,	OFFT0450
6	VGUSTW,VGUSTF,GFWJ,GLAT,GVERT,	OFFT0460
7	VXB,VZB,APO,VYB,ARO,AYD,	OFFT0470
8	COLSTK,CYSTK1,CYSTK2,PEDAL,AYE,	OFFT0480
9	APE,ARE,AIM,AIM,AITP,BITR,	OFFT0490
A	XAR(2),YAR(2),ZAR(2),	OFFT0500
B	VIMR,VITR,ZETA,ZETATR,MHR,HJR,	OFFT0510
C	TMR,TTR,OMX,QTR,YMRF,YTRF	OFFT0520
D	Y(4,150)	OFFT0530
E		OFFT0540

```

REAL MASS*(IXZ
IF(V(1,R5).EQ.0.) GO TO 225
ARD=-Y(1,R5)*SIN(APE)
CAPE=Y(1,R5)*COS(APE)
APD=CAPE*SIN(ARE)
AYD=CAPE*COS(ARE)
GO TO 226
225 CONTINUE
IF(V(2,R6).EQ.1.) GO TO 224
APED=32.17*(Y(2,R6)-COS(APE)*COS(ARE))/V
CALL CATS (AYE,APE,ARE,AYFP,APFP,O.,AYPB,APPB,APB,1,-1)
CALL RATS (O.,APED,O.,AYPB,APPB,APB,ARD,APD,AYD,-1)
226 CONTINUE
DX = MASS*(APD*VZB-AYD*VYB)
DY = MASS*(AYD*VXB-ARD*VZB)
DZ = MASS*(ARD*VYB-APD*VXB)
DL = APD*(AYD*D(71Y-ARD*IXZ)
DM = ARD*AYD*D(71Y-ARD*IXZ)
DN = APD*(ARD*D(71Y-AYD*IXZ)
CALL RATS (ARD,APD,AYD,O.,-ZETA,C.,ARTD,APT,TV,-1)
CALL RATS (ARD,APD,AYD,AYMT,APBMT,ARBMT,ARTD,APT,TV,-1)
224 CONTINUE
RETURN
END

```

```

OFFT0550
OFFT0560
OFFT0570
OFFT0580
OFFT0590
OFFT0600
OFFT0610
OFFT0620
OFFT0630
OFFT0640
OFFT0650
OFFT0660
OFFT0670
OFFT0680
OFFT0690
OFFT0700
OFFT0710
OFFT0720
OFFT0730
OFFT0740
OFFT0750
OFFT0760
OFFT0770
OFFT0780

```

CURTINE PARA (W,COND1)
 COMMON /FORCE/ XF,XFRWG,XFLWG,XFELE,XFFUS,XFRJET,
 XFLJET,XFMR,XFTR,XFGUN,XFFIN,XFW,
 YF,YFFUS,YFRJET,YFLJET,YFMR,YFTR,
 YFGUN,YFFIN,YFW,
 ZF,ZFRWG,ZFLWG,ZFELE,ZFFUS,ZFRJET,
 ZFLJET,ZFMR,ZFTR,ZFGUN,ZFW,
 OL,LRWG,LLWG,LELE,LFUS,LRJET,LLJET,
 LMR,LTR,LGUN,LFIN,LQMR,LQTR,
 OM,MRWG,MLWG,MELF,MFUS,MPJET,MLJET,
 MMR,MTR,MGUN,MFIN,MQMR,MQTR,
 ON,NPWG,NLWG,NFLE,NFUS,NRJET,NLJET,
 NMR,NTR,NGUN,NFIN,NQMR,NQTR
 COMMON /STRAB/ D(21),E(79),F(10),X(14),
 OL,OM,DM,DX,DY,DZ,IX,IY,IZ,PD(10,11),
 DTR,EPD,FRR(10),KMI,RHQ,
 Q12,SPD(6,6,3),XBW(21),XFL(14),
 XFR(7),XFC(29),XFN(7),XFS(35),
 XGN(7),XIT(21),XMR(49),XTR(49),
 XWG(21),YMR(21),YTR(21),YWG(21),
 YFL(21),YFN(21),BLCG,DAMP,DEPD(10),
 EPDS,FDD(10),MASS,QSVI,THRS,YTRS,
 WLCG,XCON(63),XJET(14),XMIN,AYEFP,
 PETAES(2),CNPCD,DHADO,DYBDR,GUESS,
 NPASS,PDPH(10,11),STAGG,TZERO,
 XMAST,DHADAQ,DQCCOL,DTRRSQ,DYBDR,
 ENGRPM,MXPASS,PSD30P,TRIND1,XLIMIT
 COMMON /STRIMA/ AY,VH,AGM,DTI(2),DT2(2),IXZ,
 QMR,YXD,YVD,ZZQ,ALGF,APFP,AYFP,
 CGWL,COLL(6),CYCF(3),CYCL(3),
 D1ST,KCIT(20),PEDA(3),OMAX,
 QMRS,TIME,TMAX,XCIT(20,6),ALGEZ,
 ALGE1,ALGE2,CGSTA,CPWIC,DIXIZ,
 DIVIX,DIV(Y,DT7MT,DTZM),DTZT1,FTKTS,
 HURKMI(2),HURKI(2,2),
 KREAD,PIJ30,TSTAR(14),ZMAX2,ZMAX3,
 ASECOL,CYPWIC,GEARAT,PSD55C,
 PSTSTP,OXRRAK,RUDIND,ZDELT1,ZDELT2
 COMMON /MAVAL/ Q,AP,PED,QWG,TZM,TIM,TZM,
 TZI,TIT,T2T,ALEL,CZFT,PSDD,
 S7ET,TAXL,TAXP,XAMG,XLNM(16),ZAWG,
 ALCYP,ALFIN,ALLWG,ALPWG,COELE,COFIN,
 COLWG,CORWG,CLELF,CLFIN,CLLWG,CLRWG,CWING,
 CYCRL,CYCR2,CZET4,CZET6,CZET9,RANGE,
 SZET5,SZET7,SZETR,WGCOL,XAELE,XAFIN,
 XAFUS,XAJET,YAFIN,ZAELE,ZAFIN,ZAFUS,
 YAFLE,YAFUS,YALWG,YARWG,YALJET,YARJET,
 ZAJET,ALFCR1,ALGEPD,BOTTOM,CZET11,
 CZET12,CZET13,ETZETA,HALFPI,SZET10,
 XAPYLD,YGUSTM,ZAPYLD,ZFLWGL,ZFRWG,
 TZMS,TJMS,TZMS,TZTS,T1TS,T2TS,
 CLOCK,FLOCK,XLOCK,TCLOCK
 COMMON /REMAN/ ZZ,VXSI(2),VVS(2),VZS(2),RETA(12,2),
 Y,PCG(2),COSE(7,7,2),BETANI(2),BETAX(2),BETAZ(2),

PARA0010
 PARA0020
 PARA0030
 PARA0040
 PARA0050
 PARA0060
 PARA0070
 PARA0080
 PARA0090
 PARA0100
 PARA0110
 PARA0120
 PARA0130
 PARA0140
 PARA0150
 PARA0160
 PARA0170
 PARA0180
 PARA0190
 PARA0200
 PARA0210
 PARA0220
 PARA0230
 PARA0240
 PARA0250
 PARA0260
 PARA0270
 PARA0280
 PARA0290
 PARA0300
 PARA0310
 PARA0320
 PARA0330
 PARA0340
 PARA0350
 PARA0360
 PARA0370
 PARA0380
 PARA0390
 PARA0400
 PARA0410
 PARA0420
 PARA0430
 PARA0440
 PARA0450
 PARA0460
 PARA0470
 PARA0480
 PARA0490
 PARA0500
 PARA0510
 PARA0520
 PARA0530
 PARA0540

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*
1  A(12),APDO,ARON,AYDD,AIR(2),
2  OPSI(12,2),OTRR,NPSI(2),ZZTR,
3  RETAN(12,2),BNPSI(2),
4  COMD2,GMAXV,RATE1,RATE2,STOP2,
5  THROT(2),TRIND,XGUST,BETA2(2),GMAXV1,
6  GMAXV2,GMAXV3,GUSTYP,HNPSIR(2),
7  HJRRPS,HJBKRS,HJBTPS,HJBTRS,
8  KONFIG,LNGTH1,P(LGH1,PSIREF(2),
9  START2,XMOMLI(12,2),
10 RM,RTB,ORTR,ORTR,TIMT,TITT,
11 T2MT,T2TT,T2MT,T2TT,XMAL,XMALIT,
12 XMB1,XMBIT,AIBPM,AIBPT,AIBRM,AIBRT,
13 APTD,APTD,ARTD,ARTD,PSO,PSOT,
14 XSTAM,XSTAMT,YSTAM,YSTAMT,
15 HJBKP,HJBKTD,HJBKR,HJBKTR
16
17 COMMON /MANAPO/
18   ,V,IND,NWAG,APRMT,ARMT,AY8MT,BETA2(2),TDELT,
19   BETA2(2),HGUSTE,HGUSTF,HGUSTW,VGUSTE,
20   VGUSTW,VGUSTF,GWD,GLAT,GVERT,
21   VXB,VXB,APD,VYB,ARD,AYD,
22 COLSTK,CYSTK1,CYSTK2,PEOAL,AYE,
23 ADE,ARE,AIM,RIM,AITP,BITR,
24 XAR(2),VAR(2),ZAR(2),
25 VIMR,VITR,ZETA,ZETATR,HMR,HTR,
26 THR,TTR,OMX,QTR,YMRF,YTRF
27
28 COMMON /TNPLOT/
29   AM(3),AL(3),EXIT,ICOM(49),IPSN,
30   NPART,NVARA,NVAPB,NVARG,NSCALE,
31   NVARS,NPRINT,NTIME
32
33 DIMENSION P(48),HEAD(12,6),VAR(11)
34 EQUIVALENCE (VAR(1),COLSTK(
35 DATA HEAD1/ 0 MAIN FWD RIGHT TAIL AFT LEFT 0/
36
37 COMMON /METER/ HEAD(10,39(
38 (FICOMOL,MFC,C,G) TO 173
39 CALL MFCM
40 CALL WRVP (3,VAR,XML,PD,TAXL,TAXR)
41 CALL WRRT
42 WRITE(6,171(
43 GO TO 175
44
45 171 WRITE(6,171( NPASS
46 172 WRITE(6,171( NPASS
47 WRITE(6,171( HEAD(11,K,NFIC(,1,2(,HEAD(11,K,NFIC+3(,1,2(
48 P(1)=T2MT*OTRR
49 P(2)=T2TT*OTRR
50 P(3)=5*(ALRMG+ALLWG(*OTRR
51 P(4)=T(1)*OTRR
52 P(5)=T(1)*OTRR
53 P(6)=ZFRWG+ZFLWG
54 P(7)=T2MT*OTRR
55 P(8)=T2TT*OTRR
56 P(9)=XFPWG+XFLWG
57 P(10)=A1*OTRR
58 P(11)=A1*OTRR
59 P(12)=ALFL*OTRR

```

PARA0550
 PARA0560
 PARA0570
 PARA0580
 PARA0590
 PARA0600
 PARA0610
 PARA0620
 PARA0630
 PARA0640
 PARA0650
 PARA0660
 PARA0670
 PARA0680
 PARA0690
 PARA0700
 PARA0710
 PARA0720
 PARA0730
 PARA0740
 PARA0750
 PARA0760
 PARA0770
 PARA0780
 PARA0790
 PARA0800
 PARA0810
 PARA0820
 PARA0830
 PARA0840
 PARA0850
 PARA0860
 PARA0870
 PARA0880
 PARA0890
 PARA0900
 PARA0910
 PARA0920
 PARA0930
 PARA0940
 PARA0950
 PARA0960
 PARA0970
 PARA0980
 PARA0990
 PARA1000
 PARA1010
 PARA1020
 PARA1030
 PARA1040
 PARA1050
 PARA1060
 PARA1070
 PARA1080

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P(13)=BIM*OTRR
P(14)=B1TR*ENTR
P(15)=ZFFLE
P(16)=YMR
P(17)=YTR
P(18)=XFELE
WRITE (6,81) ((HEAD(I,2*J-1),I=1,10),P(3*J-2),P(3*J-1),
1 (HEAD(I,2*J),I=1,10),P(3*J),J=1,6)
P(19)=HMR
P(20)=MTR
P(21)=ALFIN*OTRR
P(22)=YMR
P(23)=YTR
P(24)=YFFIN
P(25)=OMX*PSD550
P(26)=OTR*PSD550*GEARAT
P(27)=XFFIN
WRITE (6,81) ((HEAD(I,3*J-8),I=1,10),P(3*J-2),P(3*J-1),
1 (HEAD(I,3*J-NRUN),I=1,10),P(3*J),J=7,9)
P(28)=PSD30P
P(29)=P(28)*GEARAT
P(30)=AYE*OTRR
P(31)=ZETA*OTRR
P(32)=ZETATP*OTRR
P(33)=APE*OTRR
P(34)=A19(1)
P(35)=A19(2)
P(36)=ARE*OTRR
WRITE (6,81) ((HEAD(I,2*J+2),I=1,10),P(3*J-2),P(3*J-1),
1 (HEAD(I,2*J+3),I=1,10),P(3*J),J=10,12)
P(37)=AXL
P(38)=ZZD
P(39)=TAXR
P(40)=VH*FTXTS
P(41)=COLSTR
P(42)=W
P(43)=CVSTK1
P(44)=ENGRPH
P(45)=CVSTK2
P(46)=CGSTA
P(47)=PEDAL
P(48)=CGWL
WRITE (6,82) ((HEAD(I,J-9),I=1,10),P(J),J=37,48)
CALL TIMEX (TUSED,NTIME,TLEFT)
WRITE (6,2011) NPASS,TUSED
HPSUP=OMX*PSD550
HPTOT=P(25)+P(26)
IF(HPTOT.LE.HPSUP) GO TO 300
WRITE (6,1028)
EXIT=1.
300 RETURN
90 FORMAT (1H0,49X,2A4,3X,2A4)
91 FORMAT (9X,10A4,2F10.3,5X,10A4,F10.3/)
92 FORMAT (9X,10A4,5X,F10.3,10X,10A4,F10.3/)

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PARA1090
 PARA1100
 PARA1110
 PARA1120
 PARA1130
 PARA1140
 PARA1150
 PARA1160
 PARA1170
 PARA1180
 PARA1190
 PARA1200
 PARA1210
 PARA1220
 PARA1230
 PARA1240
 PARA1250
 PARA1260
 PARA1270
 PARA1280
 PARA1290
 PARA1300
 PARA1310
 PARA1320
 PARA1330
 PARA1340
 PARA1350
 PARA1360
 PARA1370
 PARA1380
 PARA1390
 PARA1400
 PARA1410
 PARA1420
 PARA1430
 PARA1440
 PARA1450
 PARA1460
 PARA1470
 PARA1480
 PARA1490
 PARA1500
 PARA1510
 PARA1520
 PARA1530
 PARA1540
 PARA1550
 PARA1560
 PARA1570
 PARA1580
 PARA1590
 PARA1600
 PARA1610
 PARA1620

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161 FORMAT(1M1.50M HELICOPTER IS ****NOT*** IN STABLE CONDITION AFTER. PARA1630
1 15.12M ITERATIONS./16X.9M***** PARA1640
171 FORMAT(35M0HELICOPTER IS IN STABLE CONDITION./1 PARA1650
1728 FORMAT(1M0.56M***** POWER RECD. FOR TRIM COND. EXCEEDS POWER AVAIL PARA1660
1ABLE) PARA1670
2711 FORMAT (5X6MPART 1.16X13.12M ITERATIONS.20XF10.3, PARA1680
1 35M MINUTES FLAPSD COMPUTING TIME /1M1) PARA1690
END PARA1700

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```

SUMROUTINE PCG (PSD,DTZMT,1)
COMMON /STAMAN/ ML(2),XX,YY,AVI,GOV,KPD,OPC,QQQ,
1 RTY,APRG,ARBG,ASEP,AYRG,BWTC,
2 RC,BWTK,BWTH,CGRL,DPIX,DPIZ,
3 FHPT(2),R550,ALERT,AYDMX,OELT2,
4 OPIX,OTBWT,OMLCG,MOELT,HGUST,
5 MLTR1,MLTR2,ITOPS,KICTR,JMEGN,
6 PCDEL,OMRSA,RMASS,TRALT,TWOPT,VGUST,
7 ISTOP,XAGUN,XAPYL,XARSP(2),YAGUN,
8 YARSP(2),YGUST,ZAGUN,ZAPYL,ZARSP(2),
9 DELT2R,DSTAGG,ETMAST,GPRELD,HLPLYD,
A IIRAKE,OMEGMO,OBRAKE,BEYAZS(2),
B PCGED,PCGMX,PCRATE,POINTR,RDELT1,
C ROELT2,RITORS,TPIND2
COMMON /FORV/ Y(4,150)
PSOMOM=PSD-OMEGM
O1=ARSP(PCDEL)
O2=O1-.01*PCRATE
IF(OPC.EQ.10.) GO TO 224
IF(O2.GT.0.) PCDEL=PCDEL-SIGN(PCRATE,PCDEL)
GO TO 232
224 CONTINUE
IF(O2.GT.0.) GO TO 236
IF(ABS(PSOMOM).LE.(PCGOEO*OMEGM)) GO TO 226
236 CONTINUE
O2=SIGN(PCRATE,PSOMOM)
YOM=Y(1-1,84)-OMEGMD
IF(PSOMOM/(YOM+.2*PSOMOM).GT.0.) PCDEL=PCDEL+O2
IF(O1.GT.PCGMAX*MOELT) PCDEL=PCDEL-O2
IF((PSOMOM/YOM).GT.0.) GO TO 232
IF(O2.GT.MOELT*Q1/PCRATE) PCDEL=PCDEL-SIGN(PCRATE,PCDEL)
232 CONTINUE
DTZMT=DTZMT+PCDEL
226 CONTINUE
RETURN
END

```

PCG00017
 PCG00020
 PCG00030
 PCG00040
 PCG00050
 PCG00060
 PCG00070
 PCG00080
 PCG00090
 PCG00100
 PCG00110
 PCG00120
 PCG00130
 PCG00140
 PCG00150
 PCG00160
 PCG00170
 PCG00180
 PCG00190
 PCG00200
 PCG00210
 PCG00220
 PCG00230
 PCG00240
 PCG00250
 PCG00260
 PCG00270
 PCG00280
 PCG00290
 PCG00300
 PCG00310
 PCG00320
 PCG00330
 PCG00340
 PCG00350
 PCG00360

```

SUBROUTINE PDZ1 (KL)
  DIMENSION PD(10,11)
  LOGICAL AVEEP
  KONFIG=KL
  RETURN

  ENTRY PDZ (PD,AVEEP)
  ZERO THE PARTIALS OF THE FLAP MOM OF ONE ROTOR WRT TO
  THE FLAP ANGLES OF THE OTHER ROTOR

  DO 303 I=7,8
  DO 303 J=7,8
  PD(I,J+2)=0.
  303 PD(I+2,J)=0.
  IF TANDEM RETURN
  DO 301 I(287,300,301),KONFIG
  IF SIDE-BY-SIDE WITH SIDESLIP RETURN
  301 IF(AVEEP) RETURN
  SET LEFT ROTOR DERIVATIVES TO MAGNITUDE OF CORRESPONDING
  RIGHT ROTOR DERIVATIVES
  DO 297 J=9,10
  PD(9,J)=SIGN(PD(7,J-2),PD(9,J))
  PD(10,J)=SIGN(PD(9,J-2),PD(10,J))
  DO 292 I=1,6
  PD(I,1)=SIGN(PD(J-2,1),PD(J,1))
  292 PD(I,J)=SIGN(PD(I,J-2),PD(I,J))
  ZERO PARTIALS OF Y-FORCE, YAW, AND ROLL MOMENTS WRT
  F/A CYCLIC AND COLLECTIVE STICKS AND PITCH ANGLE
  DO 289 I=2,6,2
  PD(I,5)=0.
  DO 289 J=1,2
  289 PD(I,J)=0.
  RETURN

  SINGLE ROTOR CASES
  287 DO 288 I=9,10
  ZERO THE PARTIALS OF THE MR FLAP MOM WRT TO PEDAL
  PD(I-2,4)=0.
  DO 288 J=1,3
  ZERO THE PARTIALS OF THE TR FLAP MOM WRT STICKS
  288 PD(I,J)=0.
  289 RETURN
  END

```



```

SUBROUTINE PLOT
COMMON /TOPLOT/ AH(3),AL(3),EXIT,ICOM(49),IPSN,
1 NPART,NVARA,NVARB,NVARC,NSCALE
1 NVARS,NPRINT,NTIME
COMMON /PLOTD/ MFAO(9,267)
DIMENSION AC(3),AD(3),NVAR(3),RATE(3)
LOGICAL*1 L:(NE(101),11/1/12/2/13/3/14/4/15/5/16/6/17/7/18/8/19/9/20/10/21/11/22/12/23/13/24/14/25/15/26/16/27/17/28/18/29/19/30/20/31/21/32/22/33/23/34/24/35/25/36/26/37/27/38/28/39/29/40/30/41/31/42/32/43/33/44/34/45/35/46/36/47/37/48/38/49/39/50/40/51/41/52/42/53/43/54/44/55/45/56/46/57/47/58/48/59/49/60/50/61/51/62/52/63/53/64/54/65/55/66/56/67/57/68/58/69/59/70/60/71/61/72/62/73/63/74/64/75/65/76/66/77/67/78/68/79/69/80/70/81/71/82/72/83/73/84/74/85/75/86/76/87/77/88/78/89/79/90/80/91/81/92/82/93/83/94/84/95/85/96/86/97/87/98/88/99/90/100/91/101/92/102/93/103/94/104/95/105/96/106/97/107/98/108/99/109/100/110/111/112/113/114/115/116/117/118/119/120/121/122/123/124/125/126/127/128/129/130/131/132/133/134/135/136/137/138/139/140/141/142/143/144/145/146/147/148/149/150/151/152/153/154/155/156/157/158/159/160/161/162/163/164/165/166/167/168/169/170/171/172/173/174/175/176/177/178/179/180/181/182/183/184/185/186/187/188/189/190/191/192/193/194/195/196/197/198/199/200/201/202/203/204/205/206/207/208/209/210/211/212/213/214/215/216/217/218/219/220/221/222/223/224/225/226/227/228/229/230/231/232/233/234/235/236/237/238/239/240/241/242/243/244/245/246/247/248/249/250/251/252/253/254/255/256/257/258/259/260/261/262/263/264/265/266/267/268/269/270/271/272/273/274/275/276/277/278/279/280/281/282/283/284/285/286/287/288/289/290/291/292/293/294/295/296/297/298/299/300/301/302/303/304/305/306/307/308/309/310/311/312/313/314/315/316/317/318/319/320/321/322/323/324/325/326/327/328/329/330/331/332/333/334/335/336/337/338/339/340/341/342/343/344/345/346/347/348/349/350/351/352/353/354/355/356/357/358/359/360/361/362/363/364/365/366/367/368/369/370/371/372/373/374/375/376/377/378/379/380/381/382/383/384/385/386/387/388/389/390/391/392/393/394/395/396/397/398/399/400/401/402/403/404/405/406/407/408/409/410/411/412/413/414/415/416/417/418/419/420/421/422/423/424/425/426/427/428/429/430/431/432/433/434/435/436/437/438/439/440/441/442/443/444/445/446/447/448/449/450/451/452/453/454/455/456/457/458/459/460/461/462/463/464/465/466/467/468/469/470/471/472/473/474/475/476/477/478/479/480/481/482/483/484/485/486/487/488/489/490/491/492/493/494/495/496/497/498/499/500/501/502/503/504/505/506/507/508/509/510/511/512/513/514/515/516/517/518/519/520/521/522/523/524/525/526/527/528/529/530/531/532/533/534/535/536/537/538/539/540/541/542/543/544/545/546/547/548/549/550/551/552/553/554/555/556/557/558/559/560/561/562/563/564/565/566/567/568/569/570/571/572/573/574/575/576/577/578/579/580/581/582/583/584/585/586/587/588/589/590/591/592/593/594/595/596/597/598/599/600/601/602/603/604/605/606/607/608/609/610/611/612/613/614/615/616/617/618/619/620/621/622/623/624/625/626/627/628/629/630/631/632/633/634/635/636/637/638/639/640/641/642/643/644/645/646/647/648/649/650/651/652/653/654/655/656/657/658/659/660/661/662/663/664/665/666/667/668/669/670/671/672/673/674/675/676/677/678/679/680/681/682/683/684/685/686/687/688/689/690/691/692/693/694/695/696/697/698/699/700/701/702/703/704/705/706/707/708/709/710/711/712/713/714/715/716/717/718/719/720/721/722/723/724/725/726/727/728/729/730/731/732/733/734/735/736/737/738/739/740/741/742/743/744/745/746/747/748/749/750/751/752/753/754/755/756/757/758/759/760/761/762/763/764/765/766/767/768/769/770/771/772/773/774/775/776/777/778/779/780/781/782/783/784/785/786/787/788/789/790/791/792/793/794/795/796/797/798/799/800/801/802/803/804/805/806/807/808/809/810/811/812/813/814/815/816/817/818/819/820/821/822/823/824/825/826/827/828/829/830/831/832/833/834/835/836/837/838/839/840/841/842/843/844/845/846/847/848/849/850/851/852/853/854/855/856/857/858/859/860/861/862/863/864/865/866/867/868/869/870/871/872/873/874/875/876/877/878/879/880/881/882/883/884/885/886/887/888/889/890/891/892/893/894/895/896/897/898/899/900/901/902/903/904/905/906/907/908/909/910/911/912/913/914/915/916/917/918/919/920/921/922/923/924/925/926/927/928/929/930/931/932/933/934/935/936/937/938/939/940/941/942/943/944/945/946/947/948/949/950/951/952/953/954/955/956/957/958/959/960/961/962/963/964/965/966/967/968/969/970/971/972/973/974/975/976/977/978/979/980/981/982/983/984/985/986/987/988/989/990/991/992/993/994/995/996/997/998/999/1000/1001/1002/1003/1004/1005/1006/1007/1008/1009/1010/1011/1012/1013/1014/1015/1016/1017/1018/1019/1020/1021/1022/1023/1024/1025/1026/1027/1028/1029/1030/1031/1032/1033/1034/1035/1036/1037/1038/1039/1040/1041/1042/1043/1044/1045/1046/1047/1048/1049/1050/1051/1052/1053/1054/1055/1056/1057/1058/1059/1060/1061/1062/1063/1064/1065/1066/1067/1068/1069/1070/1071/1072/1073/1074/1075/1076/1077/1078/1079/1080/1081/1082/1083/1084/1085/1086/1087/1088/1089/1090/1091/1092/1093/1094/1095/1096/1097/1098/1099/1100/1101/1102/1103/1104/1105/1106/1107/1108/1109/1110/1111/1112/1113/1114/1115/1116/1117/1118/1119/1120/1121/1122/1123/1124/1125/1126/1127/1128/1129/1130/1131/1132/1133/1134/1135/1136/1137/1138/1139/1140/1141/1142/1143/1144/1145/1146/1147/1148/1149/1150/1151/1152/1153/1154/1155/1156/1157/1158/1159/1160/1161/1162/1163/1164/1165/116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WRITE (6,2) I4, AL(3),AH(3),RATE(3),I6,(2,14
WRITE (6,7) I7,I1,I2,I4
      (INITIAL(2F LINE TO BLANKS
      DO 3100 I=1,101
      LINE(I)=IR
      CALL TIMEF (TUSED,TDELT,TLEFT)
      READ (3) IPSN,T,A
      IF(T.GT.9999.E+24) GO TO 9999
      VTIME=NTIME+1
      IF(NTIME.EQ.NPRINT) NTIME=C
      IF(NTIME.NE.C) GO TO 6019
      SCALE DATA TO FIXED POINT POSITION ON SCALE
      X=A(NVAR)*AC(1)+AD(1)
      KY=A(NVAR)*AC(2)+AD(2)
      Y=A(NVAR)*AC(3)+AD(3)
      CHECK FOR EQUALITY OF VARIABLES
      IF(KQ.EQ.KX) GO TO 3101
      IF(KR.EQ.KY) GO TO 3102
      IF(KX.EQ.KY) GO TO 3103
      CHECK TO SEE IF VARIABLES FALL ON SCALE
      IF(KR.GE.1.AND.KR.LE.101) LINE(KR)=11
      IF(KX.GE.1.AND.KX.LE.101) LINE(KX)=12
      IF(KY.GE.1.AND.KY.LE.101) LINE(KY)=14
      GO TO 5000
3101 IF(KR.EQ.KY) GO TO 3104
      FIRST AND SECOND VARIABLES ARE IN SAME POSITION
      IF(K3.GE.1.AND.KB.LE.101) LINE(KB)=13
      IF(KY.GE.1.AND.KY.LE.101) LINE(KY)=14
      GO TO 5000
3102 IF(KB.GE.1.AND.KB.LE.101) LINE(KB)=15
      FIRST AND THIRD VARIABLES ARE IN SAME POSITION
      IF(KX.GE.1.AND.KX.LE.101) LINE(KX)=12
      GO TO 5000
3103 IF(KR.GE.1.AND.KR.LE.101) LINE(KR)=18
      SECOND AND THIRD VARIABLES ARE IN SAME POSITION
      IF(KX.GE.1.AND.KX.LE.101) LINE(KX)=18
      IF(KY.GE.1.AND.KY.LE.101) LINE(KY)=16
      GO TO 5000
      ALL THREE VARIABLES ARE IN SAME POSITION
3104 IF(KB.GE.1.AND.KB.LE.101) LINE(KB)=17
      GO TO 5000
      RESET LINE TO BLANKS
      IF(KR.GE.1.AND.KR.LE.101) LINE(KR)=18
      IF(KX.GE.1.AND.KX.LE.101) LINE(KX)=18
      IF(KY.GE.1.AND.KY.LE.101) LINE(KY)=18
      GO TO 6019
9999 CONTINUE
      CALL TIMEF (TUSED,TDELT,TLEFT)
      WRITE (6,7000) TDELT
      RETURN
6 FORMAT (1H,10X,'SCALE ',A1,' FROM',F11.3,' TO',F11.3,
1 ' ',1 INCH =',F9.3,11X,A1,' FOR ',A1,' + ',A1,'X,
2 ' ON SAME PRINT POS.')
7 FORMAT (1H,'5X,A1,' FOR ',A1,' + ',A1,' + ',A1,' ON SAME PRINT POS',F10.70,
15,'//67X,'INCHES'/T20,'0',T30,'1',T40,'2',T50,'3',T60,'4',T70,'5',PPL01080
PPL00559
PPL00560
PPL00570
PPL00580
PPL00590
PPL00600
PPL00610
PPL00620
PPL00630
PPL00640
PPL00650
PPL00660
PPL00670
PPL00680
PPL00690
PPL00700
PPL00710
PPL00720
PPL00730
PPL00740
PPL00750
PPL00760
PPL00770
PPL00780
PPL00790
PPL00800
PPL00810
PPL00820
PPL00830
PPL00840
PPL00850
PPL00860
PPL00870
PPL00880
PPL00890
PPL00900
PPL00910
PPL00920
PPL00930
PPL00940
PPL00950
PPL00960
PPL00970
PPL00980
PPL00990
PPL01000
PPL01010
PPL01020
PPL01030
PPL01040
PPL01050
PPL01060
PPL01070
PPL01080

```

PPL01090
PPL01100
PPL01110
PPL01120
PPL01130
PPL01140
PPL01150

```

2100,00,100,00,70,1100,00,1110,00,1119,00,120,00,130,00,
3 140,00,150,00,160,00,170,00,180,00,190,00,200,00,2100,00,
4 110,00,120,00)
2150 FORMAT (7X,0 SYMBO1 0A1,0 =,0A4)
2200 FORMAT (1H,5X,F9.2,4X,101A1)
2300 FORMAT (1H0,F15.5)
END

```

RATIO010
 RATIO020
 RATIO030
 RATIO040
 RATIO050
 RATIO060
 RATIO070
 RATIO080
 RATIO090
 RATIO100
 RATIO110
 RATIO120
 RATIO130
 RATIO140
 RATIO150
 RATIO160
 RATIO170
 RATIO180
 RATIO190
 RATIO200
 RATIO210
 RATIO220

```

SUBROUTINE RATIO (X,EPDX,XLIMIT,VAR)
COMMON /KVARTR/ KVAR(10)
DIMENSION VAR(11),X(10),EPOX(10)
RATIO=1.
RATIO1=1.
DO 10 I=1,10
  CHECK TO SEE IF ANY CORRECTION EXCEEDS LIMITS
  IF (ABS(X(I)).GT.XLIMIT) RATIO1=ABS(XLIMIT/X(I))
  CHOOSE RATIO SO THAT LARGEST CORRECTION = LIMIT
  IF (RATIO.LE.RATIO1) GO TO 10
  RATIO=RATIO1
  I1=1
10 CONTINUE
  MAKE CORRECTIONS
  DO 20 I=1,10
    VAR(KVAR(I))=VAR(KVAR(I))+X(I)*RATIO*EPOX(I)
    IF (RATIO.NE.1.) WRITE (6,40) X,RATIO,I
20 RETURN
40 FORMAT (1H0//1H , 'CORRECTIONS',2X,10F11.7,
1 /1H0,'RATIO APPLIED TO CORRECTION VECTOR IS ',F10.7,
2 2X,'FROM COMPONENT ',I3)
END

```

```

C
C
C
SUBROUTINE RATS (X1,Y1,Z1,A1,A2,A3,X2,Y2,Z2,N1)
  DIMENSION A(9)
  THREE DIMENSIONAL VECTOR TRANSFORMATION
  N1=1 FOR USUAL
  N1=-1 FOR INVERSE
  CALL MATRIX (A1,A2,A3,A,N1)
  X2=X1*A(1)+Y1*A(2)+Z1*A(3)
  Y2=X1*A(4)+Y1*A(5)+Z1*A(6)
  Z2=X1*A(7)+Y1*A(8)+Z1*A(9)
  RETURN
END

```

```

RATS0010
RATS0020
RATS0030
RATS0040
RATS0050
RATS0060
RATS0070
RATS0080
RATS0090
RATS0100
RATS0110

```



```

READ (5,1003) XIT
READ (5,1004) TSTAB
READ (5,1005) R
IF (NPAR.EQ.7) RETURN
READ (5,1006) ZZERO,ZDELT1,ZMAX1,ZDELT2,ZMAX2
*
T = ZZERO
IF (ZDELT1.EQ.0.) ZDELT1 = 0.1
IF (ZDELT2.EQ.0.) ZDELT2=ZDELT1
TMAX = ZMAX1
DO 201 I=1,20
READ (5,2001) NEXT, J, (XCIT(I,K),K=1,6)
KCIT(I) = J
KREAD = I
IF (NEXT.EQ.0) RETURN
201 CONTINUE
RETURN
KRETURN
1003 FORMAT(7F10.0)
1011 FORMAT(2X,18,15A4/17A4/1/44)
2001 FORMAT(11,14,5X,6F10.0)
END

```

```

READ0550
READ0560
READ0570
READ0580
READ0590
READ0600
READ0610
READ0620
READ0630
READ0640
READ0650
READ0660
READ0670
READ0680
READ0690
READ0700
READ0710
READ0720
READ0730
READ0740
READ0750

```



```

60      G(IR+1,2)=Y
      X= G(IR+1,1)*.999
174     Y=DMAX1(DABS(G(IR+1,2)*.99900),DABS(1.0-3*G(IR+1,1)))
40      DO 40 I=1,11
      UNP(I)=0.
      GO TO 15
17      DXN1=DX
      DYN1=DY
13      DXSP=DXS
      DX=DS*X
      DY=DS*Y
      DXS=DX*DX+DY*DY
      X=X+DX
      Y=Y+DY
15      RETURN
69      ICT=ICT+1
      IF(U. EQ. 0..AND. V. EQ. 0. ) GO TO 160
      IF( IR)62,62,19
19      CALL OVERFL(I0V)
      DO 23 J=1,15
      XI=X-CS(J)
      YI=Y
      TS4=V/U
      IF(BS(J))90,90,91
91      YI=(Y+Y)*XI
      XI=(XI-Y)*((XI+Y)+8S(J)
90      TS2=U/(XI+YI+YI*YI)
      U=(XI+YI+TS4)*TS2
23      V=(TS4*XI-YI)*TS2
      CALL OVERFL(I0V)
      GO TO (160,62,160).I0V
62      US=DABS(U)+DABS(V)
      U7=U7+US-US3
      U6=U4
      U5=U3
      U4=V-U2
      U3=U-U1
      U2=V
      U1=U
      US3=US2
      US2=US1
      US1=US
      IF(ICT-2)13,17,84
84      AVG=3./U7
      DO 126 I=1,6
126      DF(I)=UNP(I)*AVG
      IF(DY)55,56,55
56      DRN=DX/DXN1
      TS3=(DUN-DRN*DUN1)*DRN
      TS=1.+DRN
      TS1=TS*DUN+TS3
      TS5=-2.*UN*TS
      TS7=TS1*TS1+2.*TS3*TS5
137     DXN1=DX

```

```

RODA0550
RODA0560
RODA0570
RODA0580
RODA0590
RODA0600
RODA0610
RODA0620
RODA0630
RODA0640
RODA0650
RODA0660
RODA0670
RODA0680
RODA0690
RODA0700
RODA0710
RODA0720
RODA0730
RODA0740
RODA0750
RODA0760
RODA0770
RODA0780
RODA0790
RODA0800
RODA0810
RODA0820
RODA0830
RODA0840
RODA0850
RODA0860
RODA0870
RODA0880
RODA0890
RODA0900
RODA0910
RODA0920
RODA0930
RODA0940
RODA0950
RODA0960
RODA0970
RODA0980
RODA0990
RODA1000
RODA1010
RODA1020
RODA1030
RODA1040
RODA1050
RODA1060
RODA1070
RODA1080

```

```

55  DX=TS5*DX/(TS1+DSIGN(DSORT(DABS(TS7)),TS1))
    GO TO 138
    JPN=(DX*DXN1+DY*DYN1)/DXSP
    JIN=(DY*DXN1-DX*DYN1)/DXSP
    TS1=DUN-DRN*DUN1+DIN*DVN1
    TS2=DVN-DIN*DUN1-DRN*DVN1
    TS3=DRN*TS1-DIN*TS2
    TS4=DRN*TS2+DIN*TS1
    TS=1+DRN
    TS1=TS*DUN-DVN*DIN+TS3
    TS2=TS*DVN+DUN*DIN+TS4
    TS5=2*(VN*DIN-UN*TS)
    TS6=-2*(VN*TS+UN*DIN)
    TS7=(TS1-TS2)*(TS1+TS2)+2*(TS5*TS3-TS4*TS6)
    TS8=2*(TS1*TS2+TS4*TS5+TS3*TS6)
    TS9=DABS(TS7)*DSORT(1+(TS8/TS7)**2)
    TS3=DSORT(.5*DABS(TS9+TS7))
    TS4=DSIGN(DSORT(.5*DABS(TS9-TS7)),TS8)
    134 IF(TS1*TS3+TS2*TS4)132,131,131
    132 TS4=-TS4
    131 TS3=-TS3
    TS7=TS1+TS3
    TS8=TS2+TS4
    TS3=TS7**2+TS8**2
    TS1=(TS5*TS7+TS6*TS8)/TS3
    TS2=(TS6*TS7-TS5*TS8)/TS3
    DXN1=DX
    DYN1=DY
    DX=TS1*DXN1-TS2*DVN1
    DY=TS2*DXN1+TS1*DVN1
    DXSP=DXS
    Y=Y+DY
    128 IF (DABS(Y) .GT. 1.0-5 .AND. DABS(Y/X) .GT. '5.0-4 ) GO TO 128
    Y=0.
    DY=0.
    138 YS=Y*Y
    X=X+DX
    TS=X*X+YS
    41 IF(TST-1.0-15)41,41,74
    38 FM=FR
    73 IM=0
    X=0.
    Y=0.
    YS=0.
    74 GO TO 160
    DXS=DX*DX+DY*DY
    AT=DXS/TST
    IF (AT .LF. 1.0-15 ) GO TO 20
    IF (ICT -21 ) 305,87,88
    88 IF(AT-ATX) 87,70,70
    85 AT=ATX
    X=XX
    Y=YX
    YS=YSX

```

```

R00A1090
R00A1100
R00A1110
R00A1120
R00A1130
R00A1140
R00A1150
R00A1160
R00A1170
R00A1180
R00A1190
R00A1200
R00A1210
R00A1220
R00A1230
R00A1240
R00A1250
R00A1260
R00A1270
R00A1280
R00A1290
R00A1300
R00A1310
R00A1320
R00A1330
R00A1340
R00A1350
R00A1360
R00A1370
R00A1380
R00A1390
R00A1400
R00A1410
R00A1420
R00A1430
R00A1440
R00A1450
R00A1460
R00A1470
R00A1480
R00A1490
R00A1500
R00A1510
R00A1520
R00A1530
R00A1540
R00A1550
R00A1560
R00A1570
R00A1580
R00A1590
R00A1600
R00A1610
R00A1620

```

```

75 FM=FR
GO TO 20
87 ATX=AT
XX=X
YX=Y
YSX=YS
70 IF (ICT.LT. 25 ) GO TO 305
IF (AT.NE. ATX ) GO TO 95
IF (ICT.GE. 40) GO TO 75
305 (F(TST-SLIM2)15,15,50
31 Y=-Y
35 (IS)=YS
IS=IS-1
85 ICT=0
160 AT=0.
20 CONTINUE
IF (IR.EQ.6) GO TO 51
IR=IR+1
IS=IS+1
CS (IS)=X
G (IR,1)=X
G (IR,2)=Y
(F(Y.NE.0..AND. ICT.GT.0) GO TO 31
DO 61 I=1,2
TS2=EVL(1,1)-X
IF (YS.GT.0.) TS2=TS2+YS
61 EVL(2,1)=FVL(2,1 )/TS2
D1=(EVL(2,1)+EVL(2,2))*5
UNPT=01*Y
IF ( DABS(EVL(2,1)-EVL(2,2)) . LE. 1.0-4* DABS(D1)) GO TO 92
IF (IR.LT. 10 ) GO TO 10
51 CONTINUE
WRITE (6,54)
54 FORMAT ( ' SOLUTION EXCEEDS MAXIMUM NUMBER OF ROOTS' )
GO TO 36
50 WRITE (6,52) SLIM
52 FORMAT ( ' NEXT ROOT GREATER THAN' F10.1, ' RADIANS ' )
36 WRITE (6,655)
655 FORMAT ( ' INCOMPLETE FUNCTION, RESIDUE F(S) REMAINING.' )
92 (D=0
10=IR
X=UNPT
RETURN
END

```

R00A1630
 R00A1640
 R00A1650
 R00A1660
 R00A1670
 R00A1680
 R00A1690
 R00A1700
 R00A1710
 R00A1720
 R00A1730
 R00A1740
 R00A1750
 R00A1760
 R00A1770
 R00A1780
 R00A1790
 R00A1800
 R00A1810
 R00A1820
 R00A1830
 R00A1840
 R00A1850
 R00A1860
 R00A1870
 R00A1880
 R00A1890
 R00A1900
 R00A1910
 R00A1920
 R00A1930
 R00A1940
 R00A1950
 R00A1960
 R00A1970
 R00A1980
 R00A1990
 R00A2000
 R00A2010
 R00A2020
 R00A2030
 R00A2040
 R00A2050
 R00A2060

```

SUBROUTINE ROTAN (N)
COMMON /ANDG17/ A1,R1,XK,XY,V12,V14,APDM,APFM,AROM,ARFM,
1 AYFM,ROTJ,XK43,XLIM,CBFAC,
2 GDISK(12),NOPSI,TANAL,TANB1,
3 TANT1,TANT2,DCAFEX,K1PRINT,NORADL,
4 SHEARL(12),SHEAPD(12),SHEARR(12),
5 XMOML(12),XMOMD(12)
6 APDS,ARDS,PFAC,RFAC,APDS,ARDS
COMMON /ROMAN/
1 Z2,VXS(2),VYS(2),VZS(2),BETA(12,2),
2 T,PCC(2),COSE(7,2),BETAN(2),BETAX(2),BETAZ(2),
3 AIB(2),APDD,ARDD,AYDD,AIR(2),
4 UPSI(12,2),DTRP,NPSI(2),ZZTR,
5 BETAD(12,2),BNPSI(2),
6 CONO2,GMAXV,RATF1,RATE2,STOP2,
7 THROT(2),TRIND,XGUST,BETAZO(2),GMAXV1,
8 GMAXV2,GMAXV3,GUSTYP,MNPSIR(2),
9 HUBKPS,HUBKPS,HUBTPS,HUBTRS,
10 KONFIG,LNGTH1,PILGH1,PSIREF(2),
11 START2,XMOML(12,2),
12 R(2),OR(2),T1(2),
13 T2(2),TZR(2),XMA(2),
14 XMB(2),AIBP(2),AIBR(2),
15 APDR(2),AROR(2),PSIO(2),
16 XSTAH(2),YSTAH(2),
17 HUBKPR(2),HUBKRR(2)
18 AZETAR(2),VZETAR(2)
COMMON /MANARD/
1 I,V,IND,NMAG,APRMT,ARBMT,AYBMT,BETA0(2),TOELT,
2 BETAF(2),HGUSTE,HGUSTF,HGUSTW,HGUSTE,
3 VGUSTW,YGUSTE,GFWD,CLAT,GVERT,
4 VXB,VZB,APD,VYB,ARD,AYD,
5 COLSTK,CYSTK1,CYSTK2,PEDAL,AYE,
6 APE,ARE,AIM,BIM,ALTR,B1TR,
7 XAR(2),YAR(2),ZAR(2),
8 VIR(2),ZETAR(2),HFORCE(2),
9 THRUST(2),TORQUE(2),YFORCE(2)
COMMON /STANRO/
1 J,W,ITM,VHS(2),LINK,DELE,VROT(2),
2 VSNO,YFIN(2),ZFEL(2),AIBAL(2),
3 B1BAL(2),COND1,SWING,PILGH2,PWGELL,
4 B(2),PMOM(2),RMDM(2)
COMMON /ROSTAR/
1 AM(2),CT,PT,XB(2),ALT,AOR(2),EXH(2),
2 NXR(2),RBH(2),SWC(2),UHS,COMB(2),LROT(2),
3 RAB(2),RTRP(2),TAIM(14),CONEK(2),DCAFR(2),FVIND,
4 NVARD,
5 SWKR1(2),SWKR2(2),TIPIR(2),TIP3B(2),
6 TWIST(20,2),CLRAOK(2),DELTA3(2),
7 LAMBDAL(2),UPGUST,URGUST,UTGUST,WROTOR,
8 ER(2),ERX(2),
9 XLIMAX(2),XLIMIN(2)
COMMON /TOPILOT/
1 AH(3),AL(3),EXIT,ICOM(49),IPSM,
2 NPART,NVARA,NVARB,NVARC,NSCALE,
3 NVARS,NPRINT,NTIME
1 DIMENSION FLAP(2,2),HEADRO(6),AA(60)
EQUIVALENCE (FLAP(1,1),AIM),(AA(1),SHEARL(1))
DATA HEADRO/'MAIN FWD RTAIL AFTLEFT'/

```

ROTAC010
 ROTA0020
 ROTA0030
 ROTA0040
 ROTA0050
 ROTA0060
 ROTA0070
 ROTA0080
 ROTA0090
 ROTA0100
 ROTA0110
 ROTA0120
 ROTA0130
 ROTA0140
 ROTA0150
 ROTA0160
 ROTA0170
 ROTA0180
 ROTA0190
 ROTA0200
 ROTA0210
 ROTA0220
 ROTA0230
 ROTA0240
 ROTA0250
 ROTA0260
 ROTA0270
 ROTA0280
 ROTA0290
 ROTA0300
 ROTA0310
 ROTA0320
 ROTA0330
 ROTA0340
 ROTA0350
 ROTA0360
 ROTA0370
 ROTA0380
 ROTA0390
 ROTA0400
 ROTA0410
 ROTA0420
 ROTA0430
 ROTA0440
 ROTA0450
 ROTA0460
 ROTA0470
 ROTA0480
 ROTA0490
 ROTA0500
 ROTA0510
 ROTAC520
 ROTA0530
 ROTA0540

```

A1=FLAP(1,N)
A1=FLAP(2,N)
DO 200 K=1,60
  AA(K)=0.
200 CONTINUE
  NPSI=NPSI(N)
  NDRADL = NXR(N)
  IPRINT = 0
  IF(COND2.GT.2.5) IPRINT = 1
  IF(LINK.LT.4.OR.IND.NE.1.OR.TAIR(1).GT.(T+TDELT)) GO TO 199
  IF(N.EQ.1.AND.NVARC.EQ.0.AND.NVARDE.NE.0) GO TO 199
  IF(N.EQ.2.AND.NVARC.EQ.0.AND.NVARDE.EQ.0) GO TO 199
  IPRINT=1
190 CONTINUE
  CALL RATS (GFWD,GLAT,GVERT,0.,-ZETAR(N),0.,GMFWD,GMLAT,GMVERT,-1)
  NROT=KONFIG+3*(N-1)
  RDTJ=3-2*N
  A1SV=A1
  B1SV=B1
  T1S=T1(N)
  T2S=T2(N)
  KOUNT=0
  CALL DOGS (ARD,APD,AYD,XAR(N),YAR(N),ZAR(N),VXR,VYR,VZR)
  AYFM=AYE
  CALL CATS (0.,-ZETAR(N),0.,AYE,APD,ARE,AYFM,APFM,ARFM,1,1)
  CBFAC=COS(APFM)*COS(ARFM)
  CALL RATS (0.,0.,WROTRD,AYFM,APFM,ARFM,XNRDT,YMROT,ZMROT,-1)
  FFWD=XNRDT*GMFWD
  FSIDE=YMROT*GMLAT
  VXR=VXR+VXB
  VYR=VYR+VYB+SWC(N)
  VYR FOR TAIL ROTOR = VYR FROM OGS + VYB*(1.-TRSHC)
  VZR=VZR+VZB
  VROT(N)=SORT(VXR**2+VYR**2+VZR**2)
  ALT=-ZZ
  VI2=.5*VROT(N)**2
  VI4=VI2**2
601 CONTINUE
  FFWD=HFORCE(N)
  FLATS=YFORCE(N)
  DT1=SWKR1(N)*(HFORCE(N)-FFWD)
  DT2=-SWKR2(N)*(YFORCE(N)+FSIDE)
  T1(N)=T1S+DT1
  T2(N)=T2S+DT2
  KOUNT=KOUNT+1
  AYBM=C.
  APBM=-ZETAR(1)
  ARBM=C.
  IF(N.EQ.1) GO TO 207
  T2(N)=-T2(N)
  AROR(N)=-AROR(N)
  YFORCF(N)=-YFORCE(N)
  A1=-B1
  AYBM=AYBMT

```

```

APRM=APRMT
ARM=ARMT
ALT=ZTR
297 CONTINUE
XLIM=XLIMAX(N)
CALL RATS (VXR,VYR,VZP,AYBM,APBM,ARBM,VXS(N),VYS(N),VZS(N),-1)
IHS=VYS(N)*2+VYS(N)*2
VHS(N)=SORT(IHS)
VYS(2)=VYS(2)
TANT1=TANT1(N)
TANT2=TANT2(N)
CALL RATS (APD,APD,AYD,AYBM,APBM,ARBM,ARDS,APDS,AYDS,-1)
CALL RATS (ARDD,APDD,AYDD,AYBM,APBM,ARBM,ARDS,APDS,AYDS,-1)
PSD2=PSD(N)*2.
APDS=APDS-VZETAR(N)
ARM=PSD2*ARDS+APDS-VZETAR(N)
APDM=PSD2*APDS-APDS
IF(LINK.NE.2) GO TO 289
APDR(N)=APDS
IF(N.FO.2) ARDR(N)=ARDS
APDR(N)=APDS
289 CONTINUE
IF(LINK.FO.4) GO TO 288
APDS=APDR(N)-APDS
APDS=ARDR(N)-APDS
288 CONTINUE
XK=11.25*VHS(N)
IF(VHS(N).GT.(.1067*OR(N))) XK=1.36*OR(N)-1.5*VHS(N)
IF(VHS(N).GT.(.5733*OR(N))) XK=.5*OR(N)
IF(ARS(OR(N)).LT.R(N)) GO TO 286
XK=XK/OR(N)
GO TO 1001
286 XK=.5
1001 CONTINUE
XK43=XK*1.33333
OCAFXX=OCAFR(N)*XK
IF(GUSTYP.LT.1.) GO TO 17
AYFM=AYF
CALL CATS (AYBM,APBM,ARBM,AYE,APF,AYF,APFM,AREM,1,1)
DO 19 K=1,120
GO(SK(K))=0.
19 CONTINUE
17 CONTINUE
CALL ITROT (N)
IF(EXIT.NF.0.) RETURN
IF(N.FO.1) GO TO 304
VYS(2)=VYS(2)
T2(N)=T2(N)
ARDR(N)=ARDR(N)
VFORCE(N)=VFORCE(N)
A1=-91
PMOM(N) = -RMOM(N)
104 IF(LINK.FO.4.OR.SMKRI(N).EQ.0.) GO TO 606
195MF=ABS(HFORCE(N)-FWDOS)

```

ROTAI090
 ROTAI100
 ROTAI110
 ROTAI120
 ROTAI130
 ROTAI140
 ROTAI150
 ROTAI160
 ROTAI170
 ROTAI180
 ROTAI190
 ROTAI200
 ROTAI210
 ROTAI220
 ROTAI230
 ROTAI240
 ROTAI250
 ROTAI260
 ROTAI270
 ROTAI280
 ROTAI290
 ROTAI300
 ROTAI310
 ROTAI320
 ROTAI330
 ROTAI340
 ROTAI350
 ROTAI360
 ROTAI370
 ROTAI380
 ROTAI390
 ROTAI400
 ROTAI410
 ROTAI420
 ROTAI430
 ROTAI440
 ROTAI450
 ROTAI460
 ROTAI470
 ROTAI480
 ROTAI490
 ROTAI500
 ROTAI510
 ROTAI520
 ROTAI530
 ROTAI540
 ROTAI550
 ROTAI560
 ROTAI570
 ROTAI580
 ROTAI590
 ROTAI600
 ROTAI610
 ROTAI620

```

A3SYF=ABS(YFORCE(N)-FLATS)
IF(KOUNT.EQ.1) GO TO 606
IF(KOUNT.EQ.1) GO TO 602
  ABOVE CARD USED IF DIAGNOSTICS WANTED
  IF(ABSHE.GT.1..OR.ABSYF.GT.1.) GO TO 601
  GO TO 606
602 WRITE (6,603) HEADRO(NROT),ABSHE,ABSYF
606 CONTINUE
IF(TPIND.EQ.0..AND.N.EQ.2) GO TO 305
IF(GUSTYP.LT.1..OR.I.NE.2) GO TO 305
IF(N.EQ.1) WRITE(6,9070) VGUSTW,HGUSTE,HGUSTM,HGUSTF,VGUSTF,ROTAL730
CALL DISK (GDISK)
305 IF(NWAG.EQ.0) GO TO 503
  LROT(N)=LROT(N)+1
  DLIFT=THRUST(N)-THROT(N)
  CALL WAG (R,N),LROT(N),N,V,TDELT,RED,DLIFT)
  THRUST(N)=THRUST(N)-RFD
503 IF(LINK.EQ.2..AND.J.EQ.1) RETURN
  AIBAL(N)=A1
  AIBAL(N)=81
  FLAP(1,N)=A1SV
  FLAP(2,N)=A1SV
  IF(TPINT.EQ.0) RETURN
  IF(N.EQ.1..AND.NWARD.NE.0) RETURN
  DO 702 L=1,13
    TAP(L)=TAIR(L+1)
702 CONTINUE
  TAIR(14)=9999.
  RETURN
503 FORMAT (1H0//10X,A4,' ROTOR H-FORCE AND Y-FORCE NOT BALANCED. DELTROTAL920
1AS APF,2G15.7,5X,'LRS.1)
6070 FORMAT(1H VGUSTW VGUSTE HGUSTM HGUSTF
1GUSTF/1H .6F10.3)
END

```

```

ROTAL630
ROTAL640
ROTAL650
ROTAL660
ROTAL670
ROTAL680
ROTAL690
ROTAL700
ROTAL710
ROTAL720
ROTAL730
ROTAL740
ROTAL750
ROTAL760
ROTAL770
ROTAL780
ROTAL790
ROTAL800
ROTAL810
ROTAL820
ROTAL830
ROTAL840
ROTAL850
ROTAL860
ROTAL870
ROTAL880
ROTAL890
ROTAL900
ROTAL910
ROTAL920
ROTAL930
ROTAL940
ROTAL950
ROTAL960

```

```

SUBROUTINE SETE
COMMON /FORCE/
COMMON /STRIAB/
1 D(21),DT(21),E(79),F(10),X(10),
2 DL,DM,DN,DX,DY,DZ,IX,IY,IZ,PD(10,11),
3 DTR,EPD,ERR(10),KMI,RMD,
4 R12,SPD(6,6,3),XBW(21),XEL(14),
5 XER(7),XFC(28),XFN(7),XFS(35),
6 XGN(7),XIT(21),XMR(49),XTR(49),
7 XWG(21),YMR(21),YTR(21),YWG(21),
8 YEL(21),YFN(21),BLCG,DAMP,DEPD(10),
9 EPDS,EPDX(10),MASS,QSV1,TMRS,TTRS,
A WLCG,XCON(43),XJFT(14),XMIN,AYEFP,
B BETAES(2),CNPCD,DHADO,OYBDR,GUESS,
C NPASS,PDPH(10,11),STACG,TZERO,
D XMAST,DHADAQ,DODCOL,OTRRSQ,DYBDRR,
ENGRPM,MXPASS,PSD3OP,TRINDI,XLIMIT
COMMON /MANARD/ I,V,IND,NWAG,APRMT,ARBMT,AYBMT,BETA0(2),TDELT,
1 BETAE(2),HGUSTE,HGUSTF,HGUSTW,VGUSTE,
2 VGUSTW,VGUSTF,GFND,GLAT,GVFRT,
3 VXB,VZB,APD,VYB,ARD,AYD,
4 COLSTK,CYSTKI,CYSTK2,PEDAL,AYE,
5 APE,ARE,AIM,RIM,A1TR,B1TR,
6 XAR(2),YAR(2),ZAR(2),
7 VMR,V1TR,ZETA,ZETATR,HMR,HTR,
8 TMR,TTR,OMX,QTR,YMRF,YTRF

DIMENSION KS(6)
DATA KS/1,13,22,59,46,33/
DO 301 L=1,6
90(L,7)=-A(KS(L))
301 CONTINUE
DO 74 K=1,71
E(K)=A(K)
74 CONTINUE
E(72)=TMR
E(73)=HMR
E(74)=YMRF
E(75)=OMX
E(76)=TTR
E(77)=HTR
E(78)=YTRF
E(79)=QTR
QSV1=-5*(OMX+QTR)
BETAES(1)=BETA0(1)
BETAES(2)=BETA0(2)
TMRS=TMR
TTRS=TTR
KMI=6
RETURN
END

```

```

SETE0010
SETE0020
SETE0030
SETE0040
SETE0050
SETE0060
SETE0070
SETE0080
SETE0090
SETE0100
SETE0110
SETE0120
SETE0130
SETE0140
SETE0150
SETE0160
SETE0170
SETE0180
SETE0190
SETE0200
SETE0210
SETE0220
SETE0230
SETE0240
SETE0250
SETE0260
SETE0270
SETE0280
SETE0290
SETE0300
SETE0310
SETE0320
SETE0330
SETE0340
SETE0350
SETE0360
SETE0370
SETE0380
SETE0390
SETE0400
SETE0410
SETE0420
SETE0430
SETE0440
SETE0450
SETE0460
SETE0470
SETE0480
SETE0490

```


SLTE0010
 SLTE0020
 SLTE0030
 SLTE0040
 SLTE0050
 SLTE0060
 SLTE0070
 SLTE0080
 SLTE0090
 SLTE0100
 SLTE0110

SUBROUTINE SLTE (PD ,J,L,M)
 COMMON /TRONIC/ UU(6),VV(6),TAU(22),DAMP(22),NUMRTS,GAINB,
 ! INDEX,STGAIN(6),TSTAP,COELTD,SLOT(3,9)
 DIMENSION PD(10,11),K(3,2)
 DATA K /2,5,4,1,3,5/
 DO 10 I=1,3
 SLOT(I,J)=PD(K(I,M),L)
 10 CONTINUE
 CALL SRY
 RETURN
 END

```

SUBROUTINE SLTT (A,B,K)
  DIMENSION A(3,9),B(3,9)
  L=K+2
  DO 10 I=1,3
    DO 10 J=K,L
      A(I,J)=B(I,J)
      B(I,J)=0.
  10 CONTINUE
  RETURN
  END

```

```

SLTT0010
SLTT0020
SLTT0030
SLTT0040
SLTT0050
SLTT0060
SLTT0070
SLTT0080
SLTT0090
SLTT0100

```

```

SUBROUTINE SOLVE
COMMON /STRIAB/ OI(21),DT(21),E(79),F(10),X(10),
1 OL,DM,DN,DX,DY,DZ,IX,IY,IZ,PO(10,11),
2 DTR,EPO,ERR(10),KMI,RHO,
3 R12,SPD(6,6,3),XBM(21),XEL(14),
4 XEP(7),XFC(29),XFN(7),XFS(35),
5 XGN(7),XIT(21),XMR(49),XTR(49),
6 XWG(21),YMR(21),YTR(21),YWG(21),
7 YEL(21),YFN(21),BLCG,DAMP,DEPD(10),
8 FPD,EPDX(10),MASS,OSV1,TMR,TTTS,
9 WLCG,XCON(63),XJET(14),XMIN,AYEFP,
A BETAES(2),CNPCD,DHADO,DYBDR,GUESS,
B NPASS,PDPHI(10,11),STACG,TZERO,
C XMAST,DHADAQ,DONCOL,OTRRSQ,DYBDR,
D FNGRPM,MXPASS,PSD3OP,TRINOL,XLIMIT
COMMON /TOPLOT/ AH(3),AL(3),EXIT,ICOM(49),IPSN,
1 NPART,NVARA,NVARB,NVARC,NSCALE
2 NVAR,MPRINT,NTIME
C SOLUTION OF KMI LINEAR EQUATIONS IN KMI VARIABLES
V1 = 1 + KMI
NM1=KMI-1
DO 150M = 1, KMI
K = M + 1
C CHECK FOR ZERO ON DIAGONAL
IF(ABS(PDPHI(M,M)).GE.1.E-05)GO TO 100
DO 81 I=K,KMI
IF(ABS(PDPHI(I,M)).GE.1.E-05)GO TO 82
81 CONTINUE
C SINGULAR MATRIX NO SOLUTION
EXIT=1.
RETURN
82 DO 85 III=1,N1
3=PDPHI(I,III)
PDPHI(I,III)=POPPI(M,III)
85 POPPI(M,III)=B
100 DO 110J = K, N1
110 POPPI(M,J)=POPPI(M,J)/POPPI(M,M)
IF(KMI-LT,K)GO TO 160
DO 150MP = K, KMI
DO 150 J = K, N1
150 POPPI(MP,J)=POPPI(MP,J)-PDPHI(MP,M)*PDPHI(M,J)
160 DO 180M = 1, KMI
180 X(M)=POPPI(M,N1)
DO 250K1 = 1, NM1
J = N1 - K1
K = J - 1
DO 250M = 1, K
250 X(M)=X(M)-PDPHI(M,J)*X(J)
RETURN
END

```

SOLV0010
 SOLV0020
 SOLV0030
 SOLV0040
 SOLV0050
 SOLV0060
 SOLV0070
 SOLV0080
 SOLV0090
 SOLV0100
 SOLV0110
 SOLV0120
 SOLV0130
 SOLV0140
 SOLV0150
 SOLV0160
 SOLV0170
 SOLV0180
 SOLV0190
 SOLV0200
 SOLV0210
 SOLV0220
 SOLV0230
 SOLV0240
 SOLV0250
 SOLV0260
 SOLV0270
 SOLV0280
 SOLV0290
 SOLV0300
 SOLV0310
 SOLV0320
 SOLV0330
 SOLV0340
 SOLV0350
 SOLV0360
 SOLV0370
 SOLV0380
 SOLV0390
 SOLV0400
 SOLV0410
 SOLV0420
 SOLV0430
 SOLV0440
 SOLV0450
 SOLV0460
 SOLV0470
 SOLV0480
 SOLV0490
 SOLV0500

```

SUBROUTINE SRT
COMMON /STBD/ UX,UY,U,V,T,A(9,2),ID,IO2,G(6,2),SLIM,ID,IL
COMMON /TRONIC/ UU(6),VV(6),TAU(22),DAMP(22),NR,GAINR,
1 INDEX,STGAIN(6),TSTAR,COL,SLOT(3,9)
DOUBLE PRECISION UX,UY,U,V,T,A,UR,G,UI
DO 1 I=1,6
DO 1 J=1,2
GII(J)=0.
ID=6
IO=3
IO2=9
IL=1
SLIM=10000.
T=1.
CALL R00A
151 UR=(UX-UY)*(UX+UY)
UI=2.*UX*UY
DO 2 L=1,3
M=3*L-3
DO 2 I=1,3
N=M+I
K=3*I-2
A(N,1)= SLOT(L,K+2)+SLOT(L,K+1)*UX + SLOT(L,K) *UR
2 A(N,2)= SLOT(L,K+1) *UY +SLOT IL,K )*UI
CALL DET
CALL R00B
IF (IL)161,24,161
24 NR=ID
IF (NR.GT.4) NR=4
C1L=UX
DO 3 J=1,10
UU(J)=GIJ,1)
VV(J)=G(J,2)
RETURN
END

```

SRT00010
SRT00020
SRT00030
SRT00040
SRT00050
SRT00060
SRT00070
SRT00080
SRT00090
SRT00100
SRT00110
SRT00120
SRT00130
SRT00140
SRT00150
SRT00160
SRT00170
SRT00180
SRT00190
SRT00200
SRT00210
SRT00220
SRT00230
SRT00240
SRT00250
SRT00260
SRT00270
SRT00280
SRT00290
SRT00300
SRT00310
SRT00320
SRT00330
SRT00340
SRT00350

1	COMMON /FORCE/	XF, XFRWG, XFLWG, XFELE, XFFUS, XFRJET,	STAB0010
2		XFLJET, XFR, XFR, XFFUN, XFFIN, XFM,	STAB0020
3		YF, YFFUS, YFRJET, YFLJET, YFMR, YFTR,	STAB0030
4		YFGUN, YFFIN, YFW,	STAB0040
5		ZF, ZFRWG, ZFLWG, ZFELE, ZFFUS, ZFRJET,	STAB0050
6		ZFLJET, ZFR, ZFR, ZFGUN, ZFW,	STAB0060
7		QL, LRWG, LLWG, LELE, LFUS, LRJET, LLJET,	STAB0070
8		LMR, LTR, LGUN, LFIN, LOMR, LOTR,	STAB0080
9		OM, MRWG, MLWG, MELE, MFUS, MRJET, MLJET,	STAB0090
10		MMR, MTR, MGUN, MFIN, MMR, MOTR,	STAB0100
11		ON, NRWG, NLWG, NELE, NEFUS, NRJET, NLJET,	STAB0110
12		NMR, NTR, NGUN, NFIN, NOMR, NOTR	STAB0120
13	COMMON /STRIB/	DL(21), DT(21), E(79), F(12), X(10),	STAB0130
14		DL, DM, DN, DX, DY, DZ, IX, IY, IZ, PD(10, 11),	STAB0140
15		DTR, EPD, ERP(10), KML, RMC,	STAB0150
16		R12, SPD(6, 6, 3), XRM(21), XEL(14),	STAB0160
17		XEP(7), XFC(28), XFN(7), XFS(35),	STAB0170
18		XGN(7), XIT(21), XMR(49), XTR(49),	STAB0180
19		XWG(21), YMR(21), YTR(21), YMG(21),	STAB0190
20		VEL(21), YFN(21), BLGG, DAMP, DEPD(10),	STAB0200
21		EPDS, EPDX(10), MASS, OSV1, THPS, TTRS,	STAB0210
22		WLCG, XCON(63), XJET(13), XMIN, AVEFP,	STAB0220
23		BETAES(2), CNPCD, DHADQ, DYBR, GUESS,	STAB0230
24		NPASS, PDPM(10, 11), STAGG, TZERO,	STAB0240
25		XMAST, DHADQ, OODCOL, DTRRSQ, DYBDBR,	STAB0250
26		FNGRPM, XNPASS, PSD3OP, TRIND1, XLIMIT	STAB0260
27	COMMON /STRIMA/	AY, VHM, OM, DT(2), DT2(2), IXZ,	STAB0270
28		OMR, XXD, YVD, ZZO, ALGF, APEP, AYFP,	STAB0280
29		CGML, COLL(6), CYCF(3), CYCL(3),	STAB0290
30		DIET, KCIT(20), PEDAI(3), OMAY,	STAB0300
31		OMRS, TIME, TMAX, XCIT(20, 6), ALGEZ,	STAB0310
32		ALGFI, ALGEZ, CGSTA, CPMIC, DIXI2,	STAB0320
33		DIYIX, DIZIY, DTZMT, DTZMI, DTZTI, FTKIS,	STAB0330
34		HUBKM(2, 2), HUBKI(2, 2),	STAB0340
35		KREAD, PIU30, TSTAR(14), ZMAX2, ZMAX3,	STAB0350
36		ASECOL, CYPMIC, GFARAT, PSD590,	STAB0360
37		PSISTP, QXBRK, RUIND, ZDELTI, ZDELT2	STAB0370
38	COMMON /MANAL/	Q, AP, PED, OMG, TZM, TIM, T2M,	STAB0380
39		TZT, T1T, T2T, ALEL, CZFT, PSD0,	STAB0390
40		SZET, TAXL, TAXR, XAWG, XLNK(16), ZAWG,	STAB0400
41		ALCYP, ALFIN, ALLWG, ALRWG, COELE, COFIN,	STAB0410
42		COLWG, CORWG, CLELE, CLFIN, CLLWG, CLRWG, CWMG,	STAB0420
43		CYCR1, CYCR2, CZET4, CZET6, CZET9, RANGE,	STAB0430
44		SZETS, SZET7, SZETR, MGCOL, XAELE, XAFIN,	STAB0440
45		XAFUS, XAJET, YAFIN, ZAELE, ZAFIN, ZAFUS,	STAB0450
46		YAELE, YAFUS, YALWG, YARWG, YALJET, YARJET,	STAB0460
47		ZAJET, ALECR1, ALGPD, BOTTOH, CZET11,	STAB0470
48		CZET12, CZET13, E1'ETA, HALFPI, SZET10,	STAB0480
49		XAPYLD, YGUSTM, ZAPYLD, ZFLWGI, ZFRWGI	STAB0490
50		TZMS, TMS, T2MS, T2TS, T1TS, T2TS,	STAB0500
51		CLOCK, FLOCK, XLOCK, TCLOCK	STAB0510
52	COMMON /ROMAN/	ZZ, VXS(2), VVS(2), VZS(2), BETA(12, 2),	STAB0520
53		T, PCC(2), COSE(7, 7, 2), BETAN(2), BETAZ(2),	STAB0530
54			STAB0540

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* 1 A1(12),APDD,ARDD,AYDD,A1R(2),
2 DSI(12,2),OTRR,NPSI(2),ZZTR,
3 RETAD(12,2),RNP(2),
4 COND2,GMAXV,RATE1,RATE2,STOP2,
5 THROT(2),TRIND,XGUST,BETAZD(2),GMAXV1,
6 GMAXV2,GMAXV3,GUSTYP,MNPSIR(2),
7 HURKPS,HURKPS,HURTPS,HUBTRS,
8 KONFIG,LNGTH1,PILGH1,PSIRFF(2),
9 START2,XMDML1(12,2),
10 RM,RTR,OPM,OPTR,TIMT,TITT,
11 T2MT,T2TT,T2MT,T2TT,XMAL,XMAL1,
12 XMB1,XMB1T,AIRPM,AIRPT,AIBRM,AIBRT,
13 APTD,APTID,ARTQ,ARTD,PSD,PSD1,
14 XSTAHM,XSTAHM,YSTAHM,YSTAHM,
15 HUBKP,HUBKTP,HUBKR,HUBKTR
16 ,AZETA,AZETA1,VZETA,VZETA1
17 RETAE(2),HGUSTE,HGUSTE,GUSTM,VGUSTE,
18 VGUSTM,VGUSTE,GFMD,GLAT,GVFT,
19 VXB,VXB,APD,VYB,ARD,AYD,
20 COLSTK,CYSTK1,CYSTK2,PEDAL,AYE,
21 APE,ARE,AIM,BIM,A1TR,B1TR,
22 XAR(2),VAR(2),ZAR(2),
23 VIMR,V1TR,ZETA,ZETA1,MHR,MTR,
24 TMR,TTR,OMX,QTR,YMRF,YTRF
25 COMMON /STANDQ/ J,M,ITM,VHS(2),LINK,OELE,VKOT(2),
26 VSND,VFIN(2),ZFEEL(2),AIBAL(2),
27 PIRAL(2),COND1,SWING,PILGH2,PWCELL,
28 RM,RTR,PMOMM,PMOMT,RMDMM,RMDMT
29 COMMON /TOPLOT/ AH(1),AL(3),EXIT,ICOM(49),JPSN,
30 NPART,NVARA,NVARR,NVARC,NSCALF
31 ,NVAR,NPPTINT,NTIME
32 COMMON /KVARTR/ KVAR(10)
33 DIMENSION VAR(6),FPODI(6),A(71),KS(6),FEAD1(2)
34 ,VAR1(6),UNIT(4),DAPTD(6),DARTD(6),DAPTTD(6),
35 DARTTD(6),VARSV(4),DPSISV(7,2)
36 EQUIVALENCE (VAR(1),VXB),(A(1),XF),(VAR1(1),COLSTK)
37 DATA HEAD//MAINTAIL//
38 DATA KS/12,2,32,45,58,71/
39 LTNK=3
40 KVAR(5)=5
41 KVAR(6)=6
42 DTZ41=RETAE(1)*PCC(11)
43 DTZT1=RETAE(2)*PCC(12)
44 VIMOS=V)MR
45 VITKS=V)TP
46 DO 313 N=1,4
47 VAPSV(N)=VAP1(N)
48 IF (PSD-EQ.0.) GO TO 309
49 DO 315 I=1,7
50 DPSISV(I,1)=DPSI(I,1)
51 DPSISV(I,2)=DPSI(I,2)
52 CONTINUE
53 CONTINUE

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```

J=1
VPS(1)=12
VPS(2)=12
CALL NOPS11 (NPS1,MNPS1R,ANPS1,DPS1)
CALL AJAC08
  (TM=4)
A(RPM)=XMA1
A(RPM)=XMA1
A(RPT)=XMA1T
A(RPT)=XMA1T
309 CONTINUE
J=2
CALL SETE
CALL JACOBI
DO 312 J=1,6
  DAPTD(J)=0.
  DARTD(J)=0.
  DAPTTD(J)=0.
  DARTTD(J)=0.
312 CONTINUE
  KOUNTS=0
  NCOL=0.
  COLS=COLSTK
  JNIT(1)=100.*RANGE/COLL(1)
  JNIT(2)=100.*CYCF(3)/CYCF(1)
  JNIT(3)=100.*CYCL(3)/CYCL(1)
  JNIT(4)=100.*PEDA(3)/PEDA(1)
  CALL RATS (XRD,VYD,ZZD,AYE,ARE,VX8,VY8,VZ8,-1)
  DO 306 J=1,4
    DO 306 I=1,6
      PD(I,J)=PD((J)*UNIT(J)
306 CONTINUE
      WRITE (6,404)
      CALL WRVP (2,VARI,KM1,PD,TAXL,TAXR)
      CALL RATS (0.,0.,W,AYE,APF,ARF,XFM,YFM,ZFM,-1)
      EPDD(1)=EPDS*100.
      EPDD(2)=EPDS*100.
      EPDD(3)=EPDS
      EPDD(4)=EPDS*100.
      EPDD(5)=EPDS
      EPDD(6)=EPDS
      DAPTD(3)=EPDD(3)
      CALL RATS (0.,EPDD(3),0.,AYBMT,APBMT,ARBMT,DARTTD(3),DAPTTD(3),
1 TV,-1)
      DARTD(5)=EPDD(5)*CZET
      CALL RATS (EPDD(5),0.,0.,AYBMT,APBMT,ARBMT,DARTTD(5),DAPTTD(5),
1 TV,-1)
      DARTD(6)=EPDD(6)*SZET
      CALL RATS (0.,0.,EPDD(6),AYBMT,APBMT,ARBMT,DARTTD(6),DAPTTD(6),
1 TV,-1)
      DO 55 J=1,6
        VAR(J)=VAR(J)+EPDD(J)
        APTD=APTD+DAPTD(J)
        ARTD=ARTD+DARTD(J)

```

```

STAB1090
STAB1100
STAB1110
STAB1120
STAB1130
STAB1140
STAB1150
STAB1160
STAB1170
STAB1180
STAB1190
STAB1200
STAB1210
STAB1220
STAB1230
STAB1240
STAB1250
STAB1260
STAB1270
STAB1280
STAB1290
STAB1300
STAB1310
STAB1320
STAB1330
STAB1340
STAB1350
STAB1360
STAB1370
STAB1380
STAB1390
STAB1400
STAB1410
STAB1420
STAB1430
STAB1440
STAB1450
STAB1460
STAB1470
STAB1480
STAB1490
STAB1500
STAB1510
STAB1520
STAB1530
STAB1540
STAB1550
STAB1560
STAB1570
STAB1580
STAB1590
STAB1600
STAB1610
STAB1620

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```

APITD=APITD+DAPITD(J)
APITD=APITD+DAPITD(J)
IF(J.EQ.1) GO TO 307
VAP(J-1)=VAP(J-1)-EPDD(J-1)
APTD=APTD-DAPTD(J-1)
ARTD=ARTD-DAPTD(J-1)
APITD=APITD-DAPITD(J-1)
ARTD=ARTD-DAPITD(J-1)
307 CONTINUE
RETA(1)=RETAES(1)
RETA(2)=RETAES(2)
TMR=TMRS
TTP=TTPS
308 CONTINUE
CALL ANAL
IF(X(T.NE.O.) RETURN
IF(KOUNTS.NE.O) GO TO 305
WRITE (6,401)
TV=VAP(1)
VAP(3)=VAP(3)+OTPR
CALL WVP (1,VAR,KM1,PD,TAXL,TAXR)
VAP(3)=TV
CALL WRFW
309 CONTINUE
IF(J.NE.1.OR.ZETA.LT.1.396263.OR.PSD.EQ.O.O..OR.CLOCK.NE.O.) GOTO 304
1.396263 RADIAN = 80. DEGREES
OSV2=.5*(OMX+QTR)
PO=OSV2-OSV1
IF(ABS(PO).LT.1001*APS(OSV1)) GO TO 302
KOUNTS=KOUNTS+1
IF(KOUNTS.GT.20) GO TO 302
IF(KOUNTS.NE.1) NODCOL=(OSV2-OSV3)/DCOL
IF(KOUNTS.EQ.1) OSV3=OSV2
NCOL=DCOL-DO/DQDCOL
COLSTR=COLS+NCOL
CALL SWAS (COLSTR)
T2MT=T2M+DTZM1+DTZMT+ASECOL
T2TT=T2T+DTZT1+TRIND*(DTZMT+ASECOL)
T1MT=T1M+DT1(1)
T1TT=T1T+DT1(2)
T2MT=T2M+DT2(1)
T2TT=T2T+DT2(2)
GO TO 303
302 CONTINUE
COLSTR=COLS
CALL SWAS (COLSTR)
T2MT=T2M+DTZM1+DTZMT+ASECOL
T2TT=T2T+DTZT1+TRIND*(DTZMT+ASECOL)
T1MT=T1M+DT1(1)
T1TT=T1T+DT1(2)
T2MT=T2M+DT2(1)
T2TT=T2T+DT2(2)
KOUNTS=N
DOO= (OSV3-OSV1)/EPDD(1)

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STAB1630
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 STAB2140
 STAB2150
 STAB2160


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WRITE (6,400) DDDCOL,DDDU,DCOL
34 CONTINUE
SPG(J,1,1)=XF-E(1)
SPG(J,2,1)=ZF-E(22)
SPG(J,3,1)=OM-E(46)
SPG(J,4,1)=YF-E(13)
SPG(J,5,1)=OL-E(33)
SPG(J,6,1)=QN-E(59)
SPG(J,1,2)=TMR-E(72)
SPG(J,2,2)=HMR-E(73)
SPG(J,3,2)=AIBAL(1)-A1M
SPG(J,4,2)=YMR-E(74)
SPG(J,5,2)=QMX-E(75)
SPG(J,6,2)=RIBAL(1)-R1M
SPG(J,1,3)=YTR-E(76)
SPG(J,2,3)=HTR-E(77)
SPG(J,3,3)=AIBAL(2)-A1TR
SPG(J,4,3)=YTRF-E(78)
SPG(J,5,3)=QTR-E(79)
SPG(J,6,3)=RIBAL(2)-R1TR
DO 55 LL=1,3
DO 56 K=1,6
SPG(J,K,LL)=SPG(J,K,LL)/EPDD(J)
56 CONTINUE
DO 57 K=1,71
A(K)=A(K)-E(K)
57 CONTINUE
WRITE (6,402)
CALL WPFM
L=1
DO 59 K=1,6
M=KS(K)
RAL=1.
IF(A(L).NE.0.) RAL=100./A(L)
DO 58 KK=L,M
A(KK)=A(KK)*RAL
58 CONTINUE
L=M+1
59 CONTINUE
WRITE (6,403)
CALL WPFM
55 CONTINUE
VAR(6)=VAR(6)-EPDD(6)
APTD=APTD-DAPTD(6)
ARTD=ARTD-DARTD(6)
APTTD=APTTD-DAPTTD(6)
ARTTD=ARTTD-DARTTD(6)
WRITE (6,152) ((SPG(I,J,1),I=1,6),J=1,6)
WRITE (6,153) HEAD1(1),((SPG(I,J,2),I=1,6),J=1,6)
WRITE (6,153) HEAD1(2),((SPG(I,J,3),I=1,6),J=1,6)
XAELE=XAELE-XAWS
(FLOWG,GE,.5*Q) GO TO 300
QWG=.5*Q
CW(CG=1.

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STAB2170
STAB2180
STAB2190
STAB2200
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STAB2680
STAB2690
STAB2700

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300 CONTINUE
SWING=1.
DO 299 J=1,4
DO 298 I=1,6
PD(I,J)=PD(I,J)/V
298 CONTINUE
299 CONTINUE
CALL LMODE (V,QWG,E(12),E(32),CWING,XAE(LW)
CALL LMODE (V,QWG,E(32),SWING)
LINK=4
BETA(1)=BETAES(1)
BETA(2)=BETAES(2)
TMR=TMRS
YTR=YTRS
VIMR=VIMRS
VITR=VITRS
AIBPM=0.
AIBRM=0.
AIBPT=0.
AIBRT=0.
DO 311 J=1,13
TSTAR(J)=TSTAR(J+1)
311 CONTINUE
TSTAR(14)=9999.
DO 314 J=1,4
VAR1(J)=VARSV(J)
314 CONTINUE
IF(PSD.EQ.0.) GO TO 308
NPSI(1)=BN
NPSI(2)=BTR
CALL NPSI1 (NPSI,MNPSIR,BNPSI,DPSI)
DO 316 I=1,7
DPSI(I,1)=DPSISV(I,1)
DPSI(I,2)=DPSISV(I,2)
316 CONTINUE
ITM=7
308 CONTINUE
CALL TIMEX (TUSFO,DTIME,TLFFT)
WRITE (6,20) DTIME,TUSED
RETURN
20 FORMAT (1H7,10X,F7.3,' MINUTES USED IN STAB ',5X,F8.3,
' MINUTES TOTAL RUN TIME')
152 FORMAT (1H1,47X,'STABILITY PARTIAL DERIVATIVE MATRICES'
//1H0,30X,'U',17X,'W',17X,'Q',17X,'V',17X,'P',17X,'R',
/1H0,4X,'X-FORCE',6G18.7/
5X,'Z-FORCE',6G18.7/
5X,'PITCH MOMENT',6G18.7/
/5X,'Y-FORCE',6G18.7/
5X,'ROLL MOMENT',6G18.7/
5X,'YAW MOMENT',6G18.7/)
153 FORMAT (1/62X,A4,' ROTOR'//
/5X,' THRUST',6G18.7/
5X,' H-FORCE',6G18.7/
5X,' F/A FLAPPING',6G18.7/

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STA2710
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 STA2990
 STA3000
 STA3010
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 STA3090
 STA3100
 STA3110
 STA3120
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 STA3160
 STA3170
 STA3180
 STA3190
 STA3200
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 STA3230
 STA3240

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4      /SX,'V-FORCE      ',.6G18.7/
5      SX,'TORQUE      ',.6G18.7/
6      SX,'LAT FLAPPING ',.6G18.7/
400  FORMAT (I10,'DQ/DCOL = ',.G15.7,2X,'FT-LBS/PERCENT',/
1      I10,'DQ/DOU = ',.G15.7,2X,'FT-LBS/FT/SEC ',/
2      I10,'DCOL = ',.G15.7,2X,'PERCENT')
401  FORMAT (I11)
402  FORMAT (I10,63X,'DELTA')
403  FORMAT (I10,58X,'NORMALIZED DELTA')
404  FORMAT (I11,30X,'THE FIRST FOUR ROWS OF THIS MATRIX ARE LBS OR FT-
      1LBS PER INCH OF CONTROL MOVEMENT')
      END

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STAB3250
STAB3260
STAB3270
STAB3280
STAB3290
STAB3300
STAB3310
STAB3320
STAB3330
STAB3340
STAB3350
STAB3360

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1	T, PCC(2), COSE(7, 7, 2), BFTAN(2), BETAX(2), BETAZ(2),	STAR0550
2	AIB(2), APDD, ARDC, AYDD, AIR(2),	STAR0560
3	NPSI(12, 2), DTRR, NPSI(2), ZZTR,	STAR0570
4	BETAD(12, 2), BNPSI(2),	STAR0580
5	COND2, GMAXV, RATE1, PATE2, STOP2,	STAR0590
6	THROT(2), TRIND, XGUST, BETAZD(2), GMAXV1,	STAR0600
7	GMAXV2, GMAXV3, GUSTYP, HNPISIR(2),	STAR0610
8	HURKPS, HURKRS, HURTPS, HURTRS,	STAR0620
9	KONFIG, LNGTH1, PILGHI, PSIREF(2),	STAR0630
10	START2, XMOMLI(12, 2),	STAR0640
11	RM, RTR, OPM, ORTR, TIMT, TITT,	STAR0650
12	T2MT, T2YT, T2MT, T2YT, XMAI, XMAIT,	STAR0660
13	XMBI, XMBIT, AIRPM, AIRPT, AIRRM, AIRBT,	STAR0670
14	APTD, AFTTD, ARTD, ARTTD, PSD, PSDT,	STAR0680
15	XSTAHM, XSTAHM, YSTAHM, YSTAHM,	STAR0690
16	HURKPS, HURKTP, HURKR, HURKTR	STAR0700
17	AZETA, AZETAT, VZETA, VZETAT	STAR0710
18	I, V, IND, NMAG, APRMT, ARBMT, AYBMT, BETAO(2), TDELY,	STAR0720
19	BETAF(2), HGUSTE, HGUSTF, HGUSTM, VGUSTE,	STAR0730
20	VGUSTW, VGUSTF, GFWD, GLAT, GVFT,	STAR0740
21	VXB, VZB, APD, VVB, ARD, AYD,	STAR0750
22	COLSTK, CYSTKI, CYSTK2, PEDAL, AYE,	STAR0760
23	APF, ARE, AIM, RIM, AIRT, B1TR,	STAR0770
24	XAR(2), YAR(2), ZAR(2),	STAR0780
25	VIMR, VITR, ZEVAR(2), HMR, MTR,	STAR0790
26	THRUST(2), OMX, OTR, YMR, YTRF	STAR0800
27	J, M, ITM, VMS(2), LINK, QELE, VROT(2),	STAR0810
28	VSND, YFIN(2), ZFEL(2), AIRAL(2),	STAR0820
29	BIBAL(2), CONDI, SWING, PILGH2, PWGELI,	STAR0830
30	B(2), PHOM(2), RMOM(2)	STAR0840
31	AM(2), CT, PT, XR(2), AI, T, ADR(2), EXH(2),	STAR0850
32	NXR(2), RBH(2), SWC(2), UHS, CDB(2), LRNT(2),	STAR0860
33	RAIB(2), RTRPI(2), TAIR(14), CDNEK(2), DCAFR(2), FVIND,	STAR0870
34	NVARO,	STAR0880
35	SWKR1(2), SWKR2(2), TIPIB(2), TIP38(2),	STAR0890
36	TMIST(20, 2), CLRADK(2), DELTA3(2),	STAR0900
37	LAMBDA(2), UPGUST, URGUST, UTGUST, WROTOR,	STAR0910
38	ERM, FRTR, ERXM, FRXT,	STAR0920
39	XLMAXM, XLMAXT, XLMINM, XLMINI	STAR0930
40	BH(2), C3, C4, RW, CLP, CLR, DCD, DOL, DOM, VIM,	STAR0940
41	RAIB(2), CLBO, CMNO, ETAO, NJET,	STAR0950
42	QFIN,	STAR0960
43	VIER, CLBL, YES(14),	STAR0970
44	CNBL, CNPCL, CNRCD, CNRCL, COLKS, D3ELE,	STAR0980
45	ENWC, LWMG, PMREL, PMRWG,	STAR0990
46	PTREN, RPIST, VMAXE, YAEOR(13, 5),	STAR1000
47	APBJET, AR9JET, AYBJET,	STAR1010
48	CNPCI, CNPCD2, COLJET, DZWGEL, DZWGEL,	STAR1020
49	ETAOMX, PMGWI, RCWING, SWINGH,	STAR1030
50	VENTER, VXMVER	STAR1040
51	COMMON /KVARTR/ KVAR(10)	STAR1050
52	COMMON /KVARTR/ KVAR(10)	STAR1060
53	COMMON /KVARTR/ KVAR(10)	STAR1070
54	COMMON /KVARTR/ KVAR(10)	STAR1080
55	COMMON /KVARTR/ KVAR(10)	STAR1090
56	COMMON /KVARTR/ KVAR(10)	STAR1100
57	COMMON /KVARTR/ KVAR(10)	STAR1110
58	COMMON /KVARTR/ KVAR(10)	STAR1120
59	COMMON /KVARTR/ KVAR(10)	STAR1130
60	COMMON /KVARTR/ KVAR(10)	STAR1140
61	COMMON /KVARTR/ KVAR(10)	STAR1150
62	COMMON /KVARTR/ KVAR(10)	STAR1160
63	COMMON /KVARTR/ KVAR(10)	STAR1170
64	COMMON /KVARTR/ KVAR(10)	STAR1180
65	COMMON /KVARTR/ KVAR(10)	STAR1190
66	COMMON /KVARTR/ KVAR(10)	STAR1200
67	COMMON /KVARTR/ KVAR(10)	STAR1210
68	COMMON /KVARTR/ KVAR(10)	STAR1220
69	COMMON /KVARTR/ KVAR(10)	STAR1230
70	COMMON /KVARTR/ KVAR(10)	STAR1240
71	COMMON /KVARTR/ KVAR(10)	STAR1250
72	COMMON /KVARTR/ KVAR(10)	STAR1260
73	COMMON /KVARTR/ KVAR(10)	STAR1270
74	COMMON /KVARTR/ KVAR(10)	STAR1280
75	COMMON /KVARTR/ KVAR(10)	STAR1290
76	COMMON /KVARTR/ KVAR(10)	STAR1300
77	COMMON /KVARTR/ KVAR(10)	STAR1310
78	COMMON /KVARTR/ KVAR(10)	STAR1320
79	COMMON /KVARTR/ KVAR(10)	STAR1330
80	COMMON /KVARTR/ KVAR(10)	STAR1340
81	COMMON /KVARTR/ KVAR(10)	STAR1350
82	COMMON /KVARTR/ KVAR(10)	STAR1360
83	COMMON /KVARTR/ KVAR(10)	STAR1370
84	COMMON /KVARTR/ KVAR(10)	STAR1380
85	COMMON /KVARTR/ KVAR(10)	STAR1390
86	COMMON /KVARTR/ KVAR(10)	STAR1400
87	COMMON /KVARTR/ KVAR(10)	STAR1410
88	COMMON /KVARTR/ KVAR(10)	STAR1420
89	COMMON /KVARTR/ KVAR(10)	STAR1430
90	COMMON /KVARTR/ KVAR(10)	STAR1440
91	COMMON /KVARTR/ KVAR(10)	STAR1450
92	COMMON /KVARTR/ KVAR(10)	STAR1460
93	COMMON /KVARTR/ KVAR(10)	STAR1470
94	COMMON /KVARTR/ KVAR(10)	STAR1480
95	COMMON /KVARTR/ KVAR(10)	STAR1490
96	COMMON /KVARTR/ KVAR(10)	STAR1500
97	COMMON /KVARTR/ KVAR(10)	STAR1510
98	COMMON /KVARTR/ KVAR(10)	STAR1520
99	COMMON /KVARTR/ KVAR(10)	STAR1530
100	COMMON /KVARTR/ KVAR(10)	STAR1540
101	COMMON /KVARTR/ KVAR(10)	STAR1550
102	COMMON /KVARTR/ KVAR(10)	STAR1560
103	COMMON /KVARTR/ KVAR(10)	STAR1570
104	COMMON /KVARTR/ KVAR(10)	STAR1580
105	COMMON /KVARTR/ KVAR(10)	STAR1590
106	COMMON /KVARTR/ KVAR(10)	STAR1600
107	COMMON /KVARTR/ KVAR(10)	STAR1610
108	COMMON /KVARTR/ KVAR(10)	STAR1620
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110	COMMON /KVARTR/ KVAR(10)	STAR1640
111	COMMON /KVARTR/ KVAR(10)	STAR1650
112	COMMON /KVARTR/ KVAR(10)	STAR1660
113	COMMON /KVARTR/ KVAR(10)	STAR1670
114	COMMON /KVARTR/ KVAR(10)	STAR1680
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116	COMMON /KVARTR/ KVAR(10)	STAR1700
117	COMMON /KVARTR/ KVAR(10)	STAR1710
118	COMMON /KVARTR/ KVAR(10)	STAR1720
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120	COMMON /KVARTR/ KVAR(10)	STAR1740
121	COMMON /KVARTR/ KVAR(10)	STAR1750
122	COMMON /KVARTR/ KVAR(10)	STAR1760
123	COMMON /KVARTR/ KVAR(10)	STAR1770
124	COMMON /KVARTR/ KVAR(10)	STAR1780
125	COMMON /KVARTR/ KVAR(10)	STAR1790
126	COMMON /KVARTR/ KVAR(10)	STAR1800
127	COMMON /KVARTR/ KVAR(10)	STAR1810
128	COMMON /KVARTR/ KVAR(10)	STAR1820
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130	COMMON /KVARTR/ KVAR(10)	STAR1840
131	COMMON /KVARTR/ KVAR(10)	STAR1850
132	COMMON /KVARTR/ KVAR(10)	STAR1860
133	COMMON /KVARTR/ KVAR(10)	STAR1870
134	COMMON /KVARTR/ KVAR(10)	STAR1880
135	COMMON /KVARTR/ KVAR(10)	STAR1890
136	COMMON /KVARTR/ KVAR(10)	STAR1900
137	COMMON /KVARTR/ KVAR(10)	STAR1910
138	COMMON /KVARTR/ KVAR(10)	STAR1920
139	COMMON /KVARTR/ KVAR(10)	STAR1930
140	COMMON /KVARTR/ KVAR(10)	STAR1940
141	COMMON /KVARTR/ KVAR(10)	STAR1950
142	COMMON /KVARTR/ KVAR(10)	STAR1960
143	COMMON /KVARTR/ KVAR(10)	STAR1970
144	COMMON /KVARTR/ KVAR(10)	STAR1980
145	COMMON /KVARTR/ KVAR(10)	STAR1990
146	COMMON /KVARTR/ KVAR(10)	STAR2000
147	COMMON /KVARTR/ KVAR(10)	STAR2010
148	COMMON /KVARTR/ KVAR(10)	STAR2020
149	COMMON /KVARTR/ KVAR(10)	STAR2030
150	COMMON /KVARTR/ KVAR(10)	STAR2040
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152	COMMON /KVARTR/ KVAR(10)	STAR2060
153	COMMON /KVARTR/ KVAR(10)	STAR2070
154	COMMON /KVARTR/ KVAR(10)	STAR2080
155	COMMON /KVARTR/ KVAR(10)	STAR2090
156	COMMON /KVARTR/ KVAR(10)	STAR2100
157	COMMON /KVARTR/ KVAR(10)	STAR2110
158	COMMON /KVARTR/ KVAR(10)	STAR2120
159	COMMON /KVARTR/ KVAR(10)	STAR2130
160	COMMON /KVARTR/ KVAR(10)	STAR2140
161	COMMON /KVARTR/ KVAR(10)	STAR2150
162	COMMON /KVARTR/ KVAR(10)	STAR2160
163	COMMON /KVARTR/ KVAR(10)	STAR2170
164	COMMON /KVARTR/ KVAR(10)	STAR2180
165	COMMON /KVARTR/ KVAR(10)	STAR2190
166	COMMON /KVARTR/ KVAR(10)	STAR2200
167	COMMON /KVARTR/ KVAR(10)	STAR2210
168	COMMON /KVARTR/ KVAR(10)	STAR2220
169	COMMON /KVARTR/ KVAR(10)	STAR2230
170	COMMON /KVARTR/ KVAR(10)	STAR2240
171	COMMON /KVARTR/ KVAR(10)	STAR2250
172	COMMON /KVARTR/ KVAR(10)	STAR2260
173	COMMON /KVARTR/ KVAR(10)	STAR2270
174	COMMON /KVARTR/ KVAR(10)	STAR2280
175	COMMON /KVARTR/ KVAR(10)	STAR2290
176	COMMON /KVARTR/ KVAR(10)	STAR2300
177	COMMON /KVARTR/ KVAR(10)	STAR2310
178	COMMON /KVARTR/ KVAR(10)	STAR2320
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180	COMMON /KVARTR/ KVAR(10)	STAR2340
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182	COMMON /KVARTR/ KVAR(10)	STAR2360
183	COMMON /KVARTR/ KVAR(10)	STAR2370
184	COMMON /KVARTR/ KVAR(10)	STAR2380
185	COMMON /KVARTR/ KVAR(10)	STAR2390
186	COMMON /KVARTR/ KVAR(10)	STAR2400
187	COMMON /KVARTR/ KVAR(10)	STAR2410
188	COMMON /KVARTR/ KVAR(10)	STAR2420
189	COMMON /KVARTR/ KVAR(10)	STAR2430
190	COMMON /KVARTR/ KVAR(10)	STAR2440
191	COMMON /KVARTR/ KVAR(10)	STAR2450
192	COMMON /KVARTR/ KVAR(10)	STAR2460
193	COMMON /KVARTR/ KVAR(10)	STAR2470
194	COMMON /KVARTR/ KVAR(10)	STAR2480
195	COMMON /KVARTR/ KVAR(10)	STAR2490
196	COMMON /KVARTR/ KVAR(10)	STAR2500
197	COMMON /KVARTR/ KVAR(10)	STAR2510
198	COMMON /KVARTR/ KVAR(10)	STAR2520
199	COMMON /KVARTR/ KVAR(10)	STAR2530
200	COMMON /KVARTR/ KVAR(10)	STAR2540
201	COMMON /KVARTR/ KVAR(10)	STAR2550
202	COMMON /KVARTR/ KVAR(10)	STAR2560
203	COMMON /KVARTR/ KVAR(10)	STAR2570
204	COMMON /KVARTR/ KVAR(10)	STAR2580
205	COMMON /KVARTR/ KVAR(10)	STAR2590
206	COMMON /KVARTR/ KVAR(10)	STAR2600
207	COMMON /KVARTR/ KVAR(10)	STAR2610
208	COMMON /KVARTR/ KVAR(10)	STAR2620
209	COMMON /KVARTR/ KVAR(10)	STAR2630
210	COMMON /KVARTR/ KVAR(10)	STAR2640
211	COMMON /KVARTR/ KVAR(10)	STAR2650
212	COMMON /KVARTR/ KVAR(10)	STAR2660
213	COMMON /KVARTR/ KVAR(10)	STAR2670
214	COMMON /KVARTR/ KVAR(10)	STAR2680
215	COMMON /KVARTR/ KVAR(10)	STAR2690
216	COMMON /KVARTR/ KVAR(10)	STAR2700
217	COMMON /KVARTR/ KVAR(10)	STAR2710
218	COMMON /KVARTR/ KVAR(10)	STAR2720
219	COMMON /KVARTR/ KVAR(10)	STAR2730
220	COMMON /KVARTR/ KVAR(10)	STAR2740
221	COMMON /KVARTR/ KVAR(10)	STAR2750
222	COMMON /KVARTR/ KVAR(10)	STAR2760
223	COMMON /KVARTR/ KVAR(10)	STAR2770
224	COMMON /KVARTR/ KVAR(10)	STAR2780
225	COMMON /KVARTR/ KVAR(10)	STAR2790
226	COMMON /KVARTR/ KVAR(10)	STAR2800
227	COMMON /KVARTR/ KVAR(10)	STAR2810
228	COMMON /KVARTR/ KVAR(10)	STAR2820
229	COMMON /KVARTR/ KVAR(10)	STAR2830
230	COMMON /KVARTR/ KVAR(10)	STAR2840
231	COMMON /KVARTR/ KVAR(10)	STAR2850
232	COMMON /KVARTR/ KVAR(10)	STAR2860
233	COMMON /KVARTR/ KVAR(10)	STAR2870
234	COMMON /KVARTR/ KVAR(10)	STAR2880
235	COMMON /KVARTR/ KVAR(10)	STAR2890
236	COMMON /KVARTR/ KVAR(10)	STAR2900
237	COMMON /KVARTR/ KVAR(10)	STAR2910
238	COMMON /KVARTR/ KVAR(10)	STAR2920
239	COMMON /KVARTR/ KVAR(10)	STAR2930
240	COMMON /KVARTR/ KVAR(10)	STAR2940
241	COMMON /KVARTR/ KVAR(10)	STAR2950
242	COMMON /KVARTR/ KVAR(10)	STAR2960
243	COMMON /KVARTR/ KVAR(10)	STAR2970
244	COMMON /KVARTR/ KVAR(10)	STAR2980
245	COMMON /KVARTR/ KVAR(10)	STAR2990
246	COMMON /KVARTR/ KVAR(10)	STAR3000
247	COMMON /KVARTR/ KVAR(10)	STAR3010
248	COMMON /KVARTR/ KVAR(10)	STAR3020
249	COMMON /KVARTR/ KVAR(10)	STAR3030
250	COMMON /KVARTR/ KVAR(10)	STAR3040
251	COMMON /KVARTR/ KVAR(10)	STAR3050
252	COMMON /KVARTR/ KVAR(10)	STAR3060
253	COMMON /KVARTR/ KVAR(10)	STAR3070
254	COMMON /KVARTR/ KVAR(10)	STAR3080
255	COMMON /KVARTR/ KVAR(10)	STAR3090
256	COMMON /KVARTR/ KVAR(10)	STAR3100
257	COMMON /KVARTR/ KVAR(10)	STAR3110
258	COMMON /KVARTR/ KVAR(10)	STAR3120
259	COMMON /KVARTR/ KVAR(10)	STAR3130
260	COMMON /KVARTR/ KVAR(10)	STAR3140
261	COMMON /KVARTR/ KVAR(10)	STAR3150
262	COMMON /KVARTR/ KVAR(10)	STAR3160
263	COMMON /KVARTR/ KVAR(10)	STAR3170
264	COMMON /KVARTR/ KVAR(10)	STAR3180
265	COMMON /KVARTR/ KVAR(10)	STAR3190
266	COMMON /KVARTR/ KVAR(10)	STAR3200
267	COMMON /KVARTR/ KVAR(10)	STAR3210
268	COMMON /KVARTR/ KVAR(10)	STAR3220
269	COMMON /KVARTR/ KVAR(10)	STAR3230
270	COMMON /KVARTR/ KVAR(10)	STAR3240
271	COMMON /KVARTR/ KVAR(10)	STAR3250
272	COMMON /KVARTR/ KVAR(10)	STAR3260
273	COMMON /KVARTR/ KVAR(10)	STAR3270
274	COMMON /KVARTR/ KVAR(10)	STAR3280
275	COMMON /KVARTR/ KVAR(10)	STAR3290
276	COMMON /KVARTR/	

```

20RWEIGHT          CONTROLFLIGHT CONSTANTS ALLOWABLE ERROR
3RAT10N            STAB TIMES AIRLOAD TIMES*/
DATA HEAD1 /' ROLL YAW '
REAL IX,IY,IZ,IXZ
GUESS=0.

READ IN DATA THRU SUBROUTINE READIN.

CALL READIN (T,TAIR)

CALCULATE PHYSICAL CONSTANTS.

DTR=.174532925E-01
RHO=.002378*XFC(2A)
Q=.5*RHO
PIU30=9.54929658
DTRRS0=3282.80635
DTRR=57.2957795
R12=1./12.
PI=3.1415926536
POL0TR=.174532925E-03
HALFPI=1.570796327
TWOPI=6.283185307
TRIND=0.
TRIND1=0.
RAIR(1)=0.
RAIR(2)=0.
RAIR(1)=0.
RAIR(2)=0.
GEARAT=0.

WRITE OUT HEADINGS.

CALL WRIT
WRITE (6,100)
WRITE (6,101) (HEAD(I,1),I=1,4),XFS

CALCULATE CONSTANTS FOR FUSELAGE - SEE INPUT FORMAT GUIDE FOR
DESCRIPTION OF CONSTANTS.

W=XFS(1)
STACG=XFS(5)*R12
ALCG=XFS(6)*R12
WLCG=XFS(7)*R12
CGSTA=XFS(5)
CGAL=XFS(6)
CGML=XFS(7)
XAFUS=STACG-XFS(2)*R12
YAFUS=XFS(3)*R12-ALCG
ZAFUS=WLCG-XFS(4)*R12
IX=XFS(8)
IY=XFS(9)
IZ=XFS(10)
IXZ=XFS(11)

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ITFSTAR1000
STAR1100
STAR1110
STAR1120
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STAR1170
STAR1180
STAR1190
STAR1200
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STAR1500
STAR1510
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STAR1570
STAR1580
STAR1590
STAR1600
STAR1610
STAR1620

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```

YFS(1)=XFS(20)
YFS(2)=XFS(21)*OTRR
YFS(3)=XFS(15)
YFS(4)=XFS(16)*OTRR
YFS(5)=XFS(17)
YFS(6)=XFS(18)*OTRR
YFS(7)=XFS(22)
YFS(8)=XFS(23)*OTRR
YFS(9)=XFS(24)*OTRRSO
YFS(10)=XFS(26)
YFS(11)=XFS(27)*OTRR
YFS(12)=XFS(28)*OTRRSO
YFS(13)=XFS(25)*OTRRSO
YFS(14)=XFS(32)
WR=XFS(29)/WR12
XAPYL=(XMR(8)-XFS(30))*WR
ZAPYL=(XMR(10)-XFS(31))*WR
HLPYLD=XFS(33)
WRITE (6,101) (HEAD(I,2),I=1,4),XMR,0,YMR

CALCULATE CONSTANTS FOR MAIN ROTOR - SEE INPUT FORMAT GUIDE FOR
DESCRIPTION OF CONSTANTS.

PSD30P = XMR(13)*XFC(25)
OMEGM = PSD30P/PIU30
PSD=OMEGM (ZETAR,BH,BAIB,XMR,Q,0,1)
CALL INRD (ZETAR,BH,BAIB,XMR,Q,0,1)
WRITE (6,101) (HEAD(I,3),I=1,4),XTR,DT,YTR

CALCULATE CONSTANTS FOR TAIL ROTOR - SEE INPUT FORMAT GUIDE FOR
DESCRIPTION OF CONSTANTS.

IF(XMR(13).NE.0.) GEARAT=XTR(13)/XMR(13)
PSDT=PSD*GEARAT
IF(XTR(14).NE.0.) TRIND=1.
SWC(2)=1.-XTR(28)
CALL INRD (ZETAR,BH,BAIB,XTR,Q,0,2)
WRITE (6,101) (HEAD(I,4),I=1,4),XWG,YWG

CALCULATE CONSTANTS FOR WING - SEE INPUT FORMAT GUIDE FOR
DESCRIPTION OF CONSTANTS.

QWG=-5*Q*XWG(1)
XAWG=STAG-XWG(2)*R12
YAWG=XWG(3)*R12-BLCG
ZAWG=WLCG-XWG(4)*R12
AGW=XWG(5)*DTR
PRWG=XWG(8)
PWGK1 =XWG(9)*DTR
ETAQMX=XWG(10)
CLBO=XWG(12)
CLACL=XWG(13)
CLR=XWG(14)

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STAR1630
STAR1640
STAR1650
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STAR1680
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STAR2010
STAR2020
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STAR2110
STAR2120
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STAR2140
STAR2150
STAR2160

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C C C C C

C C C C C

C C C C C

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CLP=XWG(15)
CNB0=XWG(16)
CNBCL=XWG(17)
CNPCL=XWG(18)
CNRCJ=XWG(19)*OTR
CNPLC=XWG(20)
CNPCD=XWG(21)
WRITE (6,101) (HEAD(1,5),I=1,4),XEL,YEL

CALCULATE CONSTANTS FOR ELEVATOR - SEE INPUT FORMAT GUIDE FOR
DESCRIPTION OF CONSTANTS.

OELE=0*XEL(11)
XAELE=STACG-XEL(2)*R12
YAELE=XEL(3)*R12-BLCG
ZAELE=WLCG-XEL(4)*R12
ALGEZ=XEL(5)*OTR
PMREL=XEL(8)
VENTER=XEL(9)*1.6878
VMAXE=XEL(10)*1.6878
PMGEL1=XEL(11)*OTR
WRITE (6,101) (HEAD(1,6),I=1,4),XFN,YFN

CALCULATE CONSTANTS FOR FIN/RUDDER - SEE INPUT FORMAT GUIDE FOR
DESCRIPTION OF CONSTANTS.

QFTN=0*XFN(1)
XAFIN=STACG-XFN(2)*R12
YAFIN=XFN(3)*R12-BLCG
ZAFIN=WLCG-XFN(4)*R12
ALGF=XFN(5)*OTR
PTRFN=XFN(6)
FNSWC=1.-XFN(7)
WRITE (6,101) (HEAD(1,7),I=1,4),XJET

CALCULATE CONSTANTS FOR JET - SEE INPUT FORMAT GUIDE FOR
DESCRIPTION OF CONSTANTS.

NJET=XJET(1)
TAXR=XJET(2)
TAXL=XJET(3)
XAJET=STACG-XJET(4)*R12
YAJET=XJET(5)*R12-BLCG
ZAJET=WLCG-XJET(6)*R12
AYBJET=XJET(8)*OTR
APBJET=XJET(9)*OTR
WRITE (6,101) (HEAD(1,8),I=1,4),XBW

CALCULATE CONSTANTS FOR BOBWEIGHT - SEE INPUT FORMAT GUIDE FOR
DESCRIPTION OF CONSTANTS.

IF(XBW(1).EQ.0.) GO TO 12
R1=XBW(16)/XBW(18)
R2=R1*XBW(19)/XBW(20)

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STAR2170
 STAR2180
 STAR2190
 STAR2200
 STAR2210
 STAR2220
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 STAR2680
 STAR2690
 STAR2700


```

R3=R2*X8W(21)
TM1=X8W(9)*X8W(17)
TM=(TM1+R3*X8W(11))*R12
TI=X8W(4)+R1*X2*X8W(5)+R2*X2*X8W(6)+TM1*X8W(17)+
1 X8W(16)*X2*X8W(8)+(R1*X8W(19))*X2*X8W(10)+R3*X2*X8W(11)
GPRFLD=X8W(7)
CF=386.04*X8W(15)*X2/TI
3WTC=X8W(3)*CF
9WTK=X8W(2)*CF
RMTM=R3*X8W(11)*DTR*TM/TI*12.
RMTF= SORT(BWTK)/TMOPI
WRITE (6,13) 9WTF
13 FORMAT (1H0,10X,'BOB WEIGHT FREQUENCY = ',G12.5,' CPS')
GO TO 14
12 RMTC=0.
RMTM=0.
GPRELD=0.
14 CONTINUE
WRITE (6,101) (HEAD(I,9),I=1,4),XCON
CALL COM1 (XCON,D3ELE,TRIND,COLJET,EIMAST,PCGOED,PCGMAX)
WRITE (6,101) (HEAD(I,10),I=1,4),XFC,XCN
XCD=XFC(1)*1.6878
YVD=XFC(2)*1.6878
ZZD=XFC(3)
ZZ=-XFC(4)
IALFS=IALF
IALF=XIT(15)
KVAR(5)=6
KVAR(6)=7
IF(IALF.LT.1.OR.IALF.GT.2) IALF=1
IF(IALF.EQ.2) KVAR(6)=5
IF(GUESS.EQ.2.AND.IALF.EQ.2.AND.IALFS.EQ.1) GO TO 18
AYE=XFC(5)*DTR
ARE=XFC(7)*DTR
18 CONTINUE
IF(GUESS.EQ.2) GO TO 15
APE=XFC(6)*DTR
COLSTK=XFC(8)
CYSTK1=XFC(9)
CYSTK2=XFC(10)
PEDAL=XFC(11)
A1=XFC(15)*DTR
R1=XFC(16)*DTR
A1R=XFC(17)*DTR
R1R=XFC(18)*DTR
THRUST(1)=XFC(19)
THRUST(2)=XFC(20)
GUESS=XFC(22)
15 CONTINUE
CALL WRVP1 (HEAD1,IALF)
ENGRPM=XFC(25)
OMAX=100000.
IF(OMEGM.NE.0.AND.XFC(26).NE.0.) OMAX=XFC(26)*500./OMEGM

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STAR2990
STAR3000
STAR3010
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STAR3110
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STAR3700
STAR3710
STAR3720

```

VSND=1./XFC(27)
XAGUN=STAGG-XGN(1)*R12
YAGUN=XGN(2)*R12-BLCG
ZAGUN=WLCG-XGN(3)*R12
AYBG=XGN(4)*DTR
APBG=XGN(5)*DTR
WRITE (6,101) (HEAD(I,11),I=1,4),XER

      CALCULATE ALLOWABLE ERRORS.

FRR(1)=XER(1)
ERR(2)=XER(2)
ERR(3)=XER(3)
ERR(4)=XER(4)
ERR(5)=XER(4)
ERR(6)=XER(5)
ERR(7)=XER(6)
ERR(8)=XER(6)
ERR(9)=XEP(7)
ERR(10)=XER(7)
ERM=XER(6)
ERTR=XER(7)
WRITE (6,101) (HEAD(I,12),I=1,4),XIT
MXPASS=XIT(1)
ITM=XIT(2)
EPDS=XIT(4)/10.
COND1=XIT(5)
COND2=XIT(6)
FVIND=XIT(7)
XLMIN=XIT(8)*DTR
XLMINT=XIT(9)*DTR
FRXM=XIT(10)
ERXT=XIT(11)
XLIMIT=2.*DTR*XIT(12)
XMIN=XIT(13)*DTR
DAMP=XIT(14)
IF(FVIND-LL.G.) FVIND=.5
WRITE (6,101) (HEAD(I,13),I=1,4),TSTAB
WRITE (6,101) (HEAD(I,14),I=1,4),TAIR

      CALCULATE CONSTANTS FOR SUBROUTINE CLCD.

CALL YFIX (YMR,YAERO)
CALL MNEM
RETURN
100 FORMAT (1H0//1H .61X,'INPUT DATA'/)
101 FORMAT (1H0.55X,4A4,' GROUP'/(1H .3X,7G18.7))
END

```

```

SUBROUTINE SWAS1 (KL)
COMMON /MANAL/ Q,AP,PED,QMG,TZM,T1M,T2M,
1 TZT,T1T,T2T,ALEL,CZET,PSDD,
2 SZET,TAXL,TAXR,XAMG,XLNM(16),ZAMG,
3 ALCYP,ALFIN,ALLWG,ALWG,CDELE,COFIN,
4 COLWG,CORWG,CLELE,CLFIN,CLWG,CLWG,CWING,
5 CYCR1,CYCR2,CZET4,CZET6,CZET9,RANGE,
6 SZET5,SZET7,SZET8,WGCOL,XAELE,XAFIN,
7 XAFUS,XAJET,YAFIN,ZAELE,ZAFIN,ZAFUS,
8 YAELE,YAFUS,YALWG,YARWG,YALJET,YARJET,
9 ZAJET,ALECR1,ALGFPD,BOTTOM,CZET11,
0 CZET12,CZET13,EIZETA,MALFPI,SZET10,
A XAPYLD,YGUSTW,ZAPYLD,ZFLWG1,ZFRWG1
R ,TZMS,T1MS,T2MS,T1TS,T2TS,T2TS,
C CLOCK,FLOCK,XLOCK,TCLOCK

KONFIG=KL
RETURN
ENTRY SWAS (COLSTK)

BOTTOM = RAD
RANGE = RAD/PERCENT

      SINGLE ROTOR CONTROLS
TZMR=COLSTK+RANGE+BOTTOM
T1MR=CYCR1+CZET
T2MR=CYCR2+CZET
IF(KONFIG.NE.1) GO TO 105
TZTR=XLNM(1)+XLNM(2)+PED+XLNM(3)+PED**3
T1TR=0.
T2TR=0.
GO TO 102

      TAIL ROTOR CONTROLS FOR EITHER TANDEM OR SIDE-BY-SIDE
105 T1TR=T1MR+XLNM(1)
    TZTR=T2MR+XLNM(2)
    T2TR=T2MR+XLNM(3)
    IF(KONFIG.EQ.3) GO TO 104

      TANDEM CONTROLS
    TZTR=TZTR+XLNM(4)+T1MR
    TZMR=T2MR+XLNM(5)+T1MR
    T2TR=T2TR+XLNM(6)+PED
    T2MR=T2MR+XLNM(7)+PED
    GO TO 102

      SIDE-BY-SIDE CONTROLS
C      EXAMPLE- SZET9=XLNM(9)+SIN(PI*(ZETA))
104 TZTR=TZTR+CYCR2+CZET4+PED+SZET5
    TZMR=T2MR+CYCR2+CZET6+PED+SZET7
    T1TR=T1TR+CYCR2+SZET8+PED+CZET9
    T1MR=T1MR+CYCR2+SZET10+PED+CZET11

      CHECK CONTROL LOCKS
102 IF(CLOCK.EQ.0.) GO TO 99
    TZM=TZMS
    GO TO 98
99 TZM=T2MR
98 IF(FLOCK.EQ.0.) GO TO 97

```

SWAS0010
 SWAS0020
 SWAS0030
 SWAS0040
 SWAS0050
 SWAS0060
 SWAS0070
 SWAS0080
 SWAS0090
 SWAS0100
 SWAS0110
 SWAS0120
 SWAS0130
 SWAS0140
 SWAS0150
 SWAS0160
 SWAS0170
 SWAS0180
 SWAS0190
 SWAS0200
 SWAS0210
 SWAS0220
 SWAS0230
 SWAS0240
 SWAS0250
 SWAS0260
 SWAS0270
 SWAS0280
 SWAS0290
 SWAS0300
 SWAS0310
 SWAS0320
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 SWAS0340
 SWAS0350
 SWAS0360
 SWAS0370
 SWAS0380
 SWAS0390
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 SWAS0670
 SWAS0680
 SWAS0690
 SWAS0700
 SWAS0710
 SWAS0720
 SWAS0730
 SWAS0740
 SWAS0750

```

TIM=TIMS
TIT=TIIS
GO TO 100
97 TIM=TIMR
TIT=TIIR
100 IF(XLOCK.NE.0.) GO TO 101
T2M=T2MR
T2T=T2TR
GO TO 107
101 IF(XLOCK.LT.1.5) GO TO 96
T2M=T2MS+CYCRI+CZET12
T2T=T2TS+CYCRI+CZET13
GO TO 107
96 T2M=T2MS
T2T=T2TS
107 IF(TCLOCK.EQ.0.) GO TO 95
RETURN
95 T2T=T2TR
RETURN
END

```

```

SUBROUTINE TABINT (CL,CD,X,Z,SG)
      X = XMAC
      Z = ALD

COMMON /TAB/ CURVEL(209),CURVED(857),K(11),L(17)
DIMENSION CLO(2)
NX=9
NZ=20
N=10.*X+1.
IF(N.GT.11) N=11
KM=K(N)
DO 30 I=KM,NX
  IF(X.GE.CURVEL(I)) GO TO 30
  KX=I
  IF(I.EQ.1) KX=2
  GO TO 32
30 CONTINUE
  KX=NX
3? XL=CURVEL(KX-1)
  XM=(X-XL)/(CURVEL(KX)-XL)
  XM1=1.-XM
  M=NZ+NX
  N=Z+1.
  IF(N.GT.17) N=17
  KA=L(N)
  J=NX+KA
  DO 70 I=J,M
    IF(Z.GE.CURVEL(I)) GO TO 70
    KZ=I
    IF(I.EQ.(NX+1)) KZ=NX+2
    GO TO 72
70 CONTINUE
    KZ=M
7? ZL=CURVEL(KZ-1)
  J=(KZ-NX-2)*NX+KX+NZ
  DO 75 I=1,2
    J=J+NX
    CLO(I)=CURVEL(J-1)+XM1+CURVEL(J)*XM
75 CONTINUE
    CL=CLO(1)+(Z-ZL)/(CURVEL(KZ)-ZL)*(CLO(2)-CLO(1))
    NX=12
    N=65
    Z=Z*SG
    DO 40 I=KM,NX
      IF(X.GE.CURVED(I)) GO TO 40
      KX=I
      IF(I.EQ.1) KX=2
      GO TO 42
40 CONTINUE
      KX=NX
4? XL=CURVED(KX-1)
  XM=(X-XL)/(CURVED(KX)-XL)
  XM1=1.-XM

```

C
 C
 C
 C

```

M=NZ+NX
KA=33.+Z
IF(KA.LT.17) NA=1
IF(KA.GT.49) KA=49
J=NX+KA
DO 60 I=J,M
IF(2.GE.CURVED(I)) GO TO 60
KZ=I
IF(1.EQ.(NX+1)) KZ=NX+2
GO TO 62
60 CONTINUE
KZ=M
62 ZL=CURVED(KZ-1)
J=(KZ-NX-2)*NX+KX+NZ
DO 65 I=1,2
J=J+NX
CLO(I)=CURVED(J-1)*XM1+CURVED(J)*XM
65 CONTINUE
CD=CLO(1)+(Z-ZL)/(CURVED(KZ)-ZL)*(CLO(2)-CLO(1))
RETURN
END

```

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TAB10550
TAB10560
TAB10570
TAB10580
TAB10590
TAB10600
TAB10610
TAB10620
TAB10630
TAB10640
TAB10650
TAB10660
TAB10670
TAB10680
TAB10690
TAB10700
TAB10710
TAB10720
TAB10730
TAB10740
TAB10750

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SUBROUTINE TILT1 (KL)
COMMON /STAMAN/ HL(2),XX,YY,AY1,GOV,XPD,OPC,QOO,
1 R1Y,APBG,ARBG,ASEP,AYBG,BWTC,
2 RC,BWTK,BWTK,CGBL,OPIZ,OP1Z,
3 FHPT(2),R550,ALERT,AYDX,DELT2,
4 DX1Z,DTBWT,DWLCG,HDELT,HGUST,
5 HLTR1,HLTR2,ITORS,KTCYR,OMEGM,
6 PCOEL,OMRSA,RHASS,TRALT,TWOPI,VGUST,
7 ISTOP,XAGUM,XAPYL,XARSP(2),YAGUN,
8 YARSP(2),YGUST,ZAGUN,ZAPYL,ZARSP(2),
9 DELT2R,OSTACG,EIMAST,GPRELD,HLPYLO,
A IBRAKE,OMEGMO,QBRAKE,BETAZS(2),
B PCGDED,PCGMAX,PCRATE,POIDTR,RDELT1,
C RDELT2,RITORS,TRIND2
COMMON /MANAL/
1 Q,AP,PED,OMG,T2M,T1M,T2M,
2 T2T,T1T,T2T,ALEL,CZET,PSOD,
3 SZET,TAXL,TAXR,XAWG,XLWK(16),ZANG,
4 ALCYP,ALFIN,ALLWG,ALRWG,CDELE,CDFIN,
5 CDLWG,CDRWG,CLELE,CLFIN,CLLWG,CLRWG,CHING,
6 CYCR1,CYCR2,CZET4,CZET6,CZET9,RANGE,
7 SZET5,SZET7,SZET8,WGCOL,XAELE,XAFIN,
8 XAFUS,XAJET,YAFIN,ZAELE,ZAFIN,ZAFUS,
9 YAELE,YAFUS,YALWG,YARWG,YALJET,YARJET,
A ZAJET,ALECR1,ALGFPO,BOTTOM,CZET11,
B CZET12,CZET13,ETZETA,MALFPI,SZET10,
C XAPYLD,YGUSTM,ZAPYLD,ZFLWG1,ZFRWG1
, TZMS,TIMS,T2MS,T2TS,T1TS,T2TS,
D CLOCK,FLOCK,XLOCK,TCLOCK
E DIMENSION XAR(2),YAR(2),ZAR(2),COLL(6),DPSI(12,2),NPSI(2),
F BETAZ(2),PSIREF(2)
G KONFIG=KL
H DSTCGT=0.
I DSTCGH=0.
J DBLCG=0.
K DSTACG=0.
L DWLCG=0.
M RETURN
N ENTRY TILT (XAR,ZAR,CGWL,COLL,ZETA,CGSTA)
O SZET=SIM(ZETA)
P CZET=COS(ZETA)
Q CZETM1=1.-CZET
R XA=ZAPYL*SZET+XAPYL*CZETM1-DSTACG
S ZA=ZAPYL*CZETM1-XAPYL*SZET-DWLCG
T DSTACG=XA+DSTACG
U DWLCG=ZA+DWLCG
V ZAFUS=ZAFUS+ZA
W ZARSP(1)=ZARSP(1)+ZA
X ZARSP(2)=ZARSP(2)+ZA
Y ZAR(1)=ZARSP(1)-HL(1)*CZET
Z ZAGUN=ZAGUN+ZA
AA ZAFIN=ZAFIN+ZA
AB ZAELE=ZAELE+ZA
AC ZANG=ZANG+ZA
AD ZAJET=ZAJET+ZA

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ZAPYLD=ZARSP(1)-HLPYLD*SZET
CGWL=CGML+ZA*12.
RANGE=(COLL(6)*ZETA*COLL(5))*POIDTR
ROTTOM=COLL(2)+ZETA*(COLL(3)+ZETA*COLL(4))
CZET12=XLNK(12)*CZET
CZET13=XLNK(13)*CZET
EIZETA=EIMAST*ZETA
IF(KONFIG.NE.3) GO TO 100
CX26=COS(XLNK(14)*ZETA)
SPED2=SIN(XLNK(15)*ZETA+XLNK(16))
CZET4=XLNK(4)*CX26
CZET5=XLNK(5)*SPED2
CZET6=XLNK(6)*CX26
SZET7=XLNK(7)*SPED2
SZET8=XLNK(8)*SZET
CZET9=XLNK(9)*CZET
SZET10=XLNK(10)*SZET
CZET11=XLNK(11)*CZET
GO TO 100
ENTRY HSAF (XAR,YAR,DPSI,NPSI,CGSTA,PSIREF)
NPSI1 = NPSI(1)
SUMCOS = 0.
SUMSIN = 0.
DO 10 I=1,NPSI1
ARG = PSIREF(1) + DPSI(1,1)
SUMCOS = SUMCOS + COS(ARG)
SUMSIN = SUMSIN + SIN(ARG)
10 CONTINUE
XA=RC*SUMCOS-DSTCGH
YA=-RC*SUMSIN-DRLCG
NSTCGH = XA + DSTCGH
DBLCG = YA + DBLCG
YAFUS = YAFUS + YA
YARSP(1) = YARSP(1) + YA
YARSP(2) = YARSP(2) + YA
YAR(1) = YARSP(1)
YAR(2) = YARSP(2)
XAR(2)=XAR(2)+XA
YAGUN = YAGUN + YA
YAFIN = YAFIN + YA
YAFLE = YAELE + YA
YALWG = YALWG + YA
YARWG = YARWG + YA
YALJET = YALJET + YA
YARJET = YARJET + YA
CGBL=CGBL+YA*12.
GO TO 100
ENTRY TFFA (XAR,BETAZ,CGSTA)
XA=-RC*SZET*SIN(BETAZ(1))-DSTCGT
DSTCGT = XA + DSTCGT
100 CONTINUE
XAFUS=XAFUS+XA
XARSP(1)=XARSP(1)+XA
XARSP(2)=XARSP(2)+XA

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TILT0550
TILT0560
TILT0570
TILT0580
TILT0590
TILT0600
TILT0610
TILT0620
TILT0630
TILT0640
TILT0650
TILT0660
TILT0670
TILT0680
TILT0690
TILT0700
TILT0710
TILT0720
TILT0730
TILT0740
TILT0750
TILT0760
TILT0770
TILT0780
TILT0790
TILT0800
TILT0810
TILT0820
TILT0830
TILT0840
TILT0850
TILT0860
TILT0870
TILT0880
TILT0890
TILT0900
TILT0910
TILT0920
TILT0930
TILT0940
TILT0950
TILT0960
TILT0970
TILT0980
TILT0990
TILT1000
TILT1010
TILT1020
TILT1030
TILT1040
TILT1050
TILT1060
TILT1070
TILT1080

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TILT1090
TILT1100
TILT1110
TILT1120
TILT1130
TILT1140
TILT1150
TILT1160
TILT1170
TILT1180

XAR(1)=XARSP(1)+HL(1)*SZET
XAGUN=XAGUN+XA
XAFIN=XAFIN+XA
XAELE=XAELE+XA
XAWG=XAWG+XA
XAJET=XAJET+XA
XAPYLD=XARSP(1)+HLPYLD*SZET
CGSTA=CGSTA+XA*12.
RETURN
END

```

SUBROUTINE TINIT (TAIR)
COMMON /STRIMA/  AY,VH,AGN,DT1(2),DT2(2),IXZ,
1 QMR,XXD,YYD,ZZD,ALGF,APFP,AYFP,
2 CGML,COLL(6),CYCF(3),CYCL(3),
3 DIST,KCIT(20),PEDAC(3),QMAX,
4 QMRS,TIME,THAX,XCIT(20,6),ALGEZ,
5 ALGE1,ALGE2,CGSTA,CPMIC,DXIZ,
6 DIYIX,DIZIY,DTZMT,DTZM1,DTZT1,FTKTS,
7 HUBKM(2,2),HJBKI(2,2),
8 KREAD,PIU30,TSTAB(14),ZMAX2,ZMAX3,
9 ASECOL,CYPMIC,GEARAT,PSD550,
COMMON /STAMAN/ HL(2),XX,YY,AY1,GOV,KPD,QPC,QOO,
1 RIY,APBG,ARBG,ASEP,AYBG,BWTC,
2 RC,BWTK,BWTH,CGBL,DPIX,DPIZ,
3 FHPT(2),R55D,ALERT,AYDMX,DELT2,
4 DPIXZ,DTBWT,DWLCG,MDELT,HGUST,
5 HLTR1,HLTR2,ITORS,KTCR,OMEGM,
6 PCDEL,QMRSA,RMASS,TRALT,TWOPI,VGUST,
7 ISTOP,XAGUN,XAPYL,XARSP(2),YAGUN,
8 YARSP(2),YGUST,ZAGUN,ZAPYL,ZARSP(2),
9 DELT2R,DSTACG,EIMAST,GPRELD,HLPLYD,
A IBRAKE,OMEGMD,QBRAKE,BETAZS(2),
B PCGDED,PCGMAX,PCRATE,POIDTR,RDELT1,
C RDELT2,RITORS,TRINDZ
DIMENSION TAIR(14)
ARBG=0.
ASECOL=0.
AYDMX=0.
DTZMT=0.
DTZM1=0.
DTZT1=0.
DT1(1)=0.
DT1(2)=0.
DT2(1)=0.
DT2(2)=0.
DTBWT=0.
HGUST=0.
ISTOP=0
IBRAKE=1
KPD=0
VGUST=C.
ALERT=0.
ASEP=0.
KTCTR = 0
OMEGMD=0.
PCDEL=0.
PCRATE=0.
QOO=2.
RITORS=0.
FTKTS=,5925
R55D=.101810181AE-02
YGUST=0.
QMRSA=QMAX

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```

TINI0010
TINI0020
TINI0030
TINI0040
TINI0050
TINI0060
TINI0070
TINI0080
TINI0090
TINI0100
TINI0110
TINI0120
TINI0130
TINI0140
TINI0150
TINI0160
TINI0170
TINI0180
TINI0190
TINI0200
TINI0210
TINI0220
TINI0230
TINI0240
TINI0250
TINI0260
TINI0270
TINI0280
TINI0290
TINI0300
TINI0310
TINI0320
TINI0330
TINI0340
TINI0350
TINI0360
TINI0370
TINI0380
TINI0390
TINI0400
TINI0410
TINI0420
TINI0430
TINI0440
TINI0450
TINI0460
TINI0470
TINI0480
TINI0490
TINI0500
TINI0510
TINI0520
TINI0530
TINI0540

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HLTR2=HL(2)*TRIND2
VH=SQRT(XD**2+YD**2)
AYFP=0.
APEP=0.
IF(VH.NE.0.) AYFP=ATAN2(YD,XD)
IF(VH.NE.0..OR.ZZD.NE.0.) APFP=ATAN2(-ZZD,VH)
TRALT=100*TRIND2
DO 45 I=2,14
  IF(TSTAB(I).EQ.0.) TSTAB(I)=9999.
  IF(TAIR(I).EQ.0.) TAIR(I)=9999.
45 CONTINUE
RETURN
END

```

```

TINI0550
TINI0560
TINI0570
TINI0580
TINI0590
TINI0600
TINI0610
TINI0620
TINI0630
TINI0640
TINI0650
TINI0660
TINI0670

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SUBROUTINE TRIM		
COMMON /FORCE/	XF,XFRWG,XFLWG,XFELE,XFFUS,XFRJET,	TRIM0010
1	XFLJET,XFMR,XFTR,XFGUN,XFFIN,XFM,	TRIM0020
2	VF,YFFUS,YFRJET,VFLJET,YFMR,YFTR,	TRIM0030
3	YFGUN,YFFIN,YFW,	TRIM0040
4	ZF,ZFRWG,ZFLWG,ZFELE,ZFFUS,ZFRJET,	TRIM0050
5	ZFLJET,ZFMR,ZFTR,ZFGUN,ZFW,	TRIM0060
6	QL,LRWG,LLWG,LELE,LFUS,LRJET,LLJET,	TRIM0070
7	LMR,LTR,LGUN,LFIN,LQMR,LQTR,	TRIM0080
8	QM,MRWG,MLWG,MELF,MFUS,MRJET,MLJET,	TRIM0090
9	MMR,NTR,MGUN,MFIN,MQMR,MQTR,	TRIM0100
A	QN,NRWG,NLWG,NELE,NFUS,NRJET,NLJET,	TRIM0110
B	NMR,NTR,MGUN,NFIN,NQMR,NQTR	TRIM0120
COMMON /STRIAB/	D(21),DT(21),E(79),F(10),X(10),	TRIM0130
1	DL,DM,DN,DX,DY,DZ,IX,IY,IZ,PD(10,11),	TRIM0140
2	OTR,EPD,ERR(10),KMI,RHO,	TRIM0150
3	R12,SPD(6,6,3),XBW(21),XEL(14),	TRIM0160
4	XER(7),XFC(28),XFN(7),XFS(35),	TRIM0170
5	XGN(7),XIT(21),XMR(49),XTR(49),	TRIM0180
6	XWG(21),YMR(21),YTR(21),YWG(21),	TRIM0190
7	VEL(21),YFN(21),BLCG,DAMP,DEPD(10),	TRIM0200
8	EPDS,EPDX(10),MASS,QSV1,TMRS,TTRS,	TRIM0210
9	WLCG,XCON(63),XJET(14),XMIN,AYEFP,	TRIM0220
A	BETAES(2),CNPDC,DHADO,DYBDR,GUESS,	TRIM0230
B	NPASS,PDPHI(10,11),STACG,TZERD,	TRIM0240
C	XMAST,DHADAQ,OQDCOL,DTRRSQ,DY80BR,	TRIM0250
D	ENGRPM,NXPASS,PSD30P,TRINDI,XLIMIT	TRIM0260
COMMON /STRIMA/	AY,VH,AGW,DT1(2),DT2(2),IXZ,	TRIM0270
1	QMR,XXD,YVD,ZZD,ALGF,APFP,AYFP,	TRIM0280
2	CGWL,COLL(6),CYCF(3),CYCL(3),	TRIM0290
3	DIST,KCIT(20),PEOA(3),OMAX,	TRIM0300
4	OMRS,TIME,TMAX,XCIT(20,6),ALGEZ,	TRIM0310
5	ALGE1,ALGE2,CGSTA,CPMIC,OIXIZ,	TRIM0320
6	DIVIX,DIZIV,DTZMT,DTZML,DTZT1,FTKTS,	TRIM0330
*	HUBKM(2,2),HUBKI(2,2),	TRIM0340
7	KREAD,PIU30,TSTAB(14),ZMAX2,ZMAX3,	TRIM0350
8	ASECOL,CYPMIC,GEARAT,PS0550,	TRIM0360
9	PSISTP,OKBRK,RUDIND,ZDELT1,ZDELT2	TRIM0370
COMMON /MANAL/	Q,AP,PED,QMG,TZM,TIM,T2M,	TRIM0380
1	TZT,T1T,T2T,ALEL,CZET,PSDD,	TRIM0390
2	SZET,TAXR,XAWG,XLWK(16),ZAWG,	TRIM0400
3	ALCYP,ALFIN,ALLWG,ALRWG,CDELE,CDFIN,	TRIM0410
4	COLWG,CORWG,CLELE,CLFIN,CLLWG,CLRWG,CWING,	TRIM0420
5	CYCR1,CYCR2,CZET4,CZET6,CZET9,RANGE,	TRIM0430
6	SZET5,SZET7,SZET8,WGCOL,XAELE,XAFIN,	TRIM0440
7	XAFUS,XAJET,YAFIN,ZAELE,ZAFIN,ZAFUS,	TRIM0450
*	YAELE,YAFUS,YALWG,YARWG,YALJET,YARJET,	TRIM0460
8	ZAJET,ALECR1,ALGFPD,BOTTOM,CZET11,	TRIM0470
9	CZET12,CZET13,EIZETA,HALFPI,SZET10,	TRIM0480
A	XAPYLD,YGUSTW,ZAPYLD,ZFLWGI,ZFRWGI	TRIM0490
B	,TZMS,TIMS,T2MS,TZTS,T1TS,T2TS,	TRIM0500
C	CLOCK,FLOCK,XLOCK,TCLOCK	TRIM0510
*	ZZ,VXS(2),VYS(2),VZS(2),BETA(12,2),	TRIM0520
	T,PCC(2),CDSE(7,7,2),BETAN(2),BETAZ(2),	TRIM0530
		TRIM0540

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*      AIB(2),APDD,ARDD,AYDD,AIR(2),
1      DPSI(12,2),OTRR,NPSI(2),ZZTR,
2      BETAD(12,2),BNPSI(2),
3      CND2,GMAXV,RATEL,RATE2,STOP2,
4      THROT(2),TRIND,XGUST,BETAZD(2),GMAXV1,
5      GMAXV2,GMAXV3,GUSTYP,HMPSIR(2),
6      HUBKPS,HUMKRS,HUBTPS,HUBTRS,
7      KONFIG,LNGTH1,PILGH1,PSIREF(2),
8      START2,XMOMLI(12,2),
9      RM,RT,ORM,ORT,TIMT,T1TT,
A      T2MT,T2TT,T2MT,T2TT,XMAL,XMALIT,
B      XM01,XM01T,AIBPH,AIBPT,AIBRM,AIBRT,
C      APTD,APTD,ARTD,ARTD,PSD,PSDT,
D      XSTAHM,XSTAHM,YSTAHM,YSTAHM,
E      HUBKP,HUBKTP,HUBKR,HUBKTR
F      ,AZETA,AZETAT,VZETA,VZETAT
COMMON /MANARO/ I,V,IND,MWAG,APBMT,ARBMT,AYBMT,BETAZD(2),TOELT,
1      BETAE(2),HGUSTE,HGUSTF,HGUSTM,VGUSTE,
2      VGUSTW,VGUSTF,GFWD,GLAT,CVERT,
3      VXB,VZB,APD,VYB,ARD,AYD,
4      COLSTK,CYSTK1,CYSTK2,PEDAL,AYE,
5      APE,ARE,A1M,B1M,A1TR,B1TR,
6      XAR(2),YAR(2),ZAR(2),
7      VIMR,VITR,ZETA,ZETATR,HMR,HTR,
8      TMR,TTR,OMX,QTR,YMRF,YTRF
COMMON /STANRO/ J,M,ITM,VHS(2),LINK,QELE,VROT(2),
1      VSNO,YFIN(2),ZFEL(2),AIBAL(2),
2      B1BAL(2),CDM01,SWING,PILGH2,PMGEL1,
3      BM,BTR,PHOMM,PHOMT,RMOMM,RMOMT
COMMON /TOPLOT/ AH(3),AL(3),EXIT,ICOM(49),IPSN,
1      NPART,NVARA,NVARB,NVARC,NSCALE
2      ,NVARSD,NPRINT,NTIME
COMMON /FORV/ Y(4,150)
1      DIMENSION VAR(11),HEAD2(6,7),PSID(2),APDR(2),ARDR(2),
2      EQUIVALENCE (VAR(1),COLSTK),(PSID(1),PSD),(APDR(1),APTD),
3      (ARDR(1),ARTD)
1      DATA HEAD2/'*****COLLECTIVE STICK *****F/A CYCLIC STICK *****
2      1*LAT CYCLIC STICK *****PEDAL POSITION EXCEEDS STOPS (TRIMD92D
3      2 PERCENT FULL THROW COMPUTED)
4      LOGICAL AYEFP
5      REAL MASS,IXZ
6      AYEFP=.TRUE.
7      IF(ABS(AYE-AYEFP).LE..01.AND.Y(1,85).EQ.0.) AYEFP=.FALSE.
8      LPASS=5
9      IF(XIT(3).EQ.0.) LPASS=1
A      EPDX(1)=1./RANGE
B      EPDX(2)=1./CYCLF(3)
C      EPDX(3)=1./CYCL(3)
D      EPDX(4)=1./PEDA(3)
E      EPDX IS IN UNITS OF PERCENT PER RADIAN
F      DX=0.
1      DY=0.
2      DZ=0.
3      DL=0.

```

```

DM=0.
DM=0.
BETAES(1)=BETA(1)
BETAES(2)=BETA(2)
TMR5=TMR
TTR5=TTR
DO 4 I=5,10
  EPDX(I)=1.
4 CONTINUE
CALL DAMPER
CALL PDZ1 (KONFIG)
DO 6 K=1,10
  X(K)=0.
DO 6 L=1,11
  PD(K,L)=0.
  POPHI(K,L)=0.
6 CONTINUE
LINK=2
CALL ITRIM(LPASS)
DO 175 I=1,4
  IF(IVAR(I)-GE-0.0-AND-VAR(I)-LE-100.) GO TO 175
  WRITE (6,176) (HEAD2(J,I),J=1,6),(HEAD2(J,5),J=1,6),VAR(I),
    1 ((HEAD2(J,K),J=1,6),K=6,7)
  EXIT=1.
175 CONTINUE
DL=0.
DM=0.
OM=0.
OX=0.
OY=0.
OZ=0.
IF(IMPART-NE-2.0R-EXIT-NE-0.) RETURN
IND=0
Y(1, 1)=VXB
Y(1, 2)=VYB
Y(1, 3)=VZB
Y(1,4)=AYD
Y(1,5)=APD
Y(1,6)=ARD
Y(1,10)=AVE
Y(1,11)=APE
Y(1,12)=ARE
NPSI(1)=BM
NPSI(2)=BTR
CALL MOPS11 (NPSI,MNPSIR,BNPSI,DPSI)
TDLT = ZOELT1
TIME-TZERD-.95*TDLT
DIST= TZERO*V
AY=0.
IF(VXB-NE-0.0-OR .VYR-NE-0.) AY=ATAN2(-VYB,VXB)
OMR=OMX+OTR*GEARAT
OMRS=OMR
CALL IV. (EXIT,LINK,TAXL,TAXR,PILGH2,A1M,B1M,A1TR,B1TR)
ZFEL(1)=ZFEL

```

```

TRIM1090
TRIM1100
TRIM1110
TRIM1120
TRIM1130
TRIM1140
TRIM1150
TRIM1160
TRIM1170
TRIM1180
TRIM1190
TRIM1200
TRIM1210
TRIM1220
TRIM1230
TRIM1240
TRIM1250
TRIM1260
TRIM1270
TRIM1280
TRIM1290
TRIM1300
TRIM1310
TRIM1320
TRIM1330
TRIM1340
TRIM1350
TRIM1360
TRIM1370
TRIM1380
TRIM1390
TRIM1400
TRIM1410
TRIM1420
TRIM1430
TRIM1440
TRIM1450
TRIM1460
TRIM1470
TRIM1480
TRIM1490
TRIM1500
TRIM1510
TRIM1520
TRIM1530
TRIM1540
TRIM1550
TRIM1560
TRIM1570
TRIM1580
TRIM1590
TRIM1600
TRIM1610
TRIM1620

```

```
YFIN(1)=YFFIN  
REWIND 3  
ITM=0  
RETURN  
176 FORMAT (1H0.12A4,F7.1.12A4)  
END
```

```
TRIM1630  
TRIM1640  
TRIM1650  
TRIM1660  
TRIM1670  
TRIM1680
```

```

SUBROUTINE TURN (XFC,V,ARE)
COMMON /FORV/ Y(4,150)
DIMENSION XFC(28)
DATA G/32.17,DTR/.1745329E-01/
Y(2,86)=1.
IF(XFC(21).NE.0.) GO TO 5
DO 100 I=12,14
IF(XFC(I).EQ.0.) GO TO 100
J=I-11
GO TO (1,2,3),J
100 CONTINUE
RETURN
1 CONTINUE
GLEVEL=XFC(12)
IF(GLEVEL.LE.1.) GO TO 5
ARE=ARCOS(1./GLEVEL)
ARED=ARE/DTR
TRAD=V**2/(G*TAN(ARE))
GO TO 4
2 CONTINUE
ARED=XFC(13)
ARE=ARED*DTR
GLEVEL=1./COS(ARE)
TRAD=V**2/(G*TAN(ARE))
GO TO 4
3 CONTINUE
TRAD=XFC(14)
ARE=ATAN2(V**2,G*TRAD)
ARED=ARE/DTR
GLEVEL=1./COS(ARE)
4 CONTINUE
Y(1,85)=V/TRAD
PSID=Y(1,85)/DTR
TURN=360./ABS(PSID)
TRAD=ABS(TRAD)
WRITE (6,170) GLEVEL,ARED,TRAD,PSID,TURN
RETURN
5 CONTINUE
Y(2,86)=XFC(12)
IF(XFC(12)-1.) 6,7,8
6 CONTINUE
WRITE (6,180) XFC(12)
7 CONTINUE
RETURN
8 WRITE (6,190) XFC(12)
RETURN
170 FORMAT('' G-LEVEL = 'G12.5,10X,' BANK ANGLE = 'G12.5//,
1 ' TURN RADIUS = 'G12.5,10X,' YAW RATE = 'G12.5//,
2 ' TIME USED TO COMPLETE 360 DEGREE TURN = 'G12.5)
180 FORMAT('' PUSH-OVER WITH G-LEVEL = 'G12.5)
190 FORMAT('' PULL-UP WITH G-LEVEL = 'G12.5)
END
TURN0010
TURN0020
TURN0030
TURN0040
TURN0050
TURN0060
TURN0070
TURN0080
TURN0090
TURN0100
TURN0110
TURN0120
TURN0130
TURN0140
TURN0150
TURN0160
TURN0170
TURN0180
TURN0190
TURN0200
TURN0210
TURN0220
TURN0230
TURN0240
TURN0250
TURN0260
TURN0270
TURN0280
TURN0290
TURN0300
TURN0310
TURN0320
TURN0330
TURN0340
TURN0350
TURN0360
TURN0370
TURN0380
TURN0390
TURN0400
TURN0410
TURN0420
TURN0430
TURN0440
TURN0450
TURN0460
TURN0470
TURN0480
TURN0490
TURN0500
TURN0510
TURN0520

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SUBROUTINE VARI		
COMMON /FIRCF/	XF, XFRWG, XFLWG, XFFLE, XFFUS, XFRJET,	VARI0010
1	XFLJET, XFR, XFR, XFLUN, XFFIN, XFW,	VARI0020
2	YF, YFFUS, YFRJET, YFLJET, YFR, YFTR,	VARI0030
3	YFGUN, YFFIN, YFW,	VARI0040
4	ZF, ZFRWG, ZFLWG, ZFFLE, ZFFUS, ZFRJET,	VARI0050
5	ZFLJET, ZFR, ZFR, ZFGUN, ZF4,	VARI0060
6	OL, LRWG, LLWG, LELF, LFUS, LRJET, LLJET,	VARI0070
7	LWR, LTR, LGUN, LFIN, LWR, LOTR,	VARI0080
8	OM, MRWG, MLWG, MELF, MFRJET, MLJET,	VARI0090
9	MMR, MTR, MGUN, MFIN, MMR, MQTR,	VARI0100
A	QN, NRWG, NLWG, NELE, NFUS, NRJET, NLJET,	VARI0110
B	NMR, NTR, NGUN, NFIN, NOMR, NOTR	VARI0120
COMMON /STRIAB/	D(21), OT(21), E(79), F(10), X(10),	VARI0130
1	DL, DM, ON, DX, OY, OZ, IX, IY, IZ, PD(10,11),	VARI0140
2	DTR, EPD, ERR(10), KML, RHO,	VARI0150
3	R12, SP0(6,6,3), XRW(21), XEL(14),	VARI0160
4	XER(7), XFC(28), XFN(7), XFS(35),	VARI0170
5	XGN(7), XIT(21), XMR(49), XTR(49),	VARI0180
6	XWG(21), YNR(21), YTR(21), YWG(21),	VARI0190
7	YEL(21), YFN(21), BLCG, OAMP, DEPD(10),	VARI0200
8	EPOS, EPOX(10), MASS, OSVI, TMR, TTRS,	VARI0210
9	WLCG, XCON(63), XJET(14), XMIN, AYEFP,	VARI0220
A	BETAS(2), CNPCO, OHADQ, DYDBR, GUESS,	VARI0230
B	NPASS, POPH(10,11), STAG, T7ERO,	VARI0240
C	XMAST, DHAAQ, DQCOL, DTRSQ, DY8DBR,	VARI0250
D	ENGRPM, MXPASS, PSD30P, TRINO1, XLIMIT	VARI0260
COMMON /STRIMA/	AY, VH, AGW, OT(2), OT2(2), IXZ,	VARI0270
1	QMR, XRD, YVO, ZZO, ALGF, APFP, AYFP,	VARI0280
2	CGML, COLL(6), CYCF(3), CYCL(3),	VARI0290
3	OIST, KCIT(20), PED(3), OMAX,	VARI0300
4	QMR, TIYE, TMAX, XCIT(20,6), ALGEZ,	VARI0310
5	ALGE1, ALGE2, CGSTA, CPMIC, OIXZ,	VARI0320
6	DIYX, OIZIY, OTZMT, DTZML, OTZTI, FTKTS,	VARI0330
*	HURKI(2,2), HURKI(2,2),	VARI0340
7	KREAO, PIU30, TSTAB(14), ZMAX2, ZMAX3,	VARI0350
8	ASECOL, CYPWIC, GEARAT, PSD550,	VARI0360
9	PSISTP, OXRRAK, RUOIND, ZOELT1, ZDELT2	VARI0370
COMMON /STAMAN/	HL(2), XX, YY, AV1, GOV, KPD, QPC, QOQ,	VARI0380
1	RIY, APBG, ARBG, ASEP, AYBG, BWTG,	VARI0390
2	RC, BWTG, BWTG, CGBL, DPIX, DPIZ,	VARI0400
3	FHPT(2), R550, ALERT, AYDMX, DELT2,	VARI0410
4	DPIXZ, DTBWT, DMWCG, MDLT, HGUST,	VARI0420
5	HLTRI, HLTR2, ITOPS, KTCTR, DMWGM,	VARI0430
6	PCOEL, QMRSA, RHASS, TRALT, TMOPI, VGUST,	VARI0440
7	ISTOP, XAGUN, XAPYL, XARSP(2), YAGUN,	VARI0450
8	YARSP(2), YGUST, ZAGUN, ZAPYL, ZARSP(2),	VARI0460
9	DELTA2, OSTAG, EIMAST, GPRED, HLPYLD,	VARI0470
A	IBRAKE, OMEGMD, OBRKE, BETAZS(2),	VARI0480
B	PCGDEO, PCGMAX, PCRATE, POIOTR, ROELT1,	VARI0490
C	ROELT2, RITORS, TRINO2	VARI0500
COMMON /MANAL/	Q, AP, PEO, OMG, TZM, TIM, TZM,	VARI0510
1	TZT, TIT, T2T, ALEL, CZET, PSDD,	VARI0520
2	SZET, TAXL, TARR, XAWG, XLNK(16), ZAWG,	VARI0530
		VARI0540

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3      ALCYP,ALFIN,ALLWG,ALRWG,CDELE,CDFIN,
4      COLWG,CDRWG,CLELE,CLFIN,CLLWG,CLRWG,CWING,
5      CYCR2,CZET4,CZET6,CZET9,RANGE,
6      SZET5,SZET7,SZET8,MGCOL,XAELE,XAFIN,
7      XAFUS,XAJET,YAFIN,ZAELE,ZAFIN,ZAFUS,
8      YAELE,YAFUS,YALWG,YARWG,YALJET,YARJET,
9      ZAJET,ALECR1,ALGPO,BOTTOM,CZET11,
10     CZET12,CZET13,EIZETA,HALFPI,SZET10,
11     XAPYLO,YGUSTW,ZAPYLD,ZFLWG1,ZFRWG1
12     *TZMS,TIMS,T2MS,TZTS,T1TS,T2TS,
13     CLOCK,FLOCK,XLOCK,TLOCK
14     ZZ,VXS(2),VYS(2),VZS(2),BETA(12,2),
15     T,PCC(2),CDSE(7,2),BETAN(2),BETAX(2),BETAZ(2),
16     AIB(2),APDO,AROD,AYDO,AIR(2),
17     DPSI(12,2),OTRR,NPSI(2),ZZTR,
18     BETA0(12,2),BNPSI(2),
19     COND2,GMAXV,RATE1,RATE2,STOP2,
20     THROT(2),TRINO,XGUST,BETAZO(2),GMAXV1,
21     GMAXV2,GMAXV3,GUSTYP,MNPSIR(2),
22     HUBKPS,HUBKRS,HUBTPS,HUBTRS,
23     KONFIG,LNGTH1,PILGH1,PSIREF(2),
24     START2,XMOMLI(12,2),
25     RM,RTR,ORM,ORTR,TMT,T1TT,
26     T2MT,T2TT,TZMT,T2TT,XMA1,XMA1T,
27     XMB1,XMB1T,AIBPM,AIBPT,AIBRM,AIBRT,
28     APTO,APTO,ARTO,ARTO,PSO,PSDT,
29     XSTAHM,XSTAHM,YSTAHM,YSTAHM,
30     HUBKP,HUBKTP,HUBKR,HUBKTR
31     *AZETA,AZETAT,VZETA,VZETAT
32     I,V,INO,NWAG,APBMT,ARBMT,AYBMT,BETA0(2),TDELT,
33     BETAE(2),HGUSTE,HGUSTF,HGUSTM,VGUSTE,
34     VGUSTW,VGUSTV,GFMO,GLAT,GVERT,
35     VXB,VZB,APD,VYB,ARD,AYD,
36     COLSTK,CYSTK1,CYSTK2,PEDAL,AYE,
37     APE,ARE,A1M,R1M,A1TP,B1TR,
38     XAR(2),YAR(2),ZAP(2),
39     VIMR,V1TR,ZETA,ZETATR,HMR,HTR,
40     TMR,TTR,OMX,OTR,YMRF,YTRF
41     COMMON /TDPLNT/ AH(3),AL(3),EXIT,ICOM(49),IPSN,
42     NPART,NVARA,NVARR,NVARG,NSCALE
43     ,NVARS,NPRINT,NTIME
44     COMMON /FORV/ V(4,150)
45     REAL LGUN,MGUN,NGUN
46     DIMENSION TAX(2),PSID(2),HUBK(2,2)
47     DIMENSION COMLOK(4),THEIS(6),THET(6),XMOI(3),PDM(3,4),DTHETO(3)
48     EQUIVALENCE (TAX(1),TAXL),(PSID(1),PSO),(HUBK(1,1),HUBKP)
49     EQUIVALENCE (COMLOK(1),CLOCK),(THEIS(1),TZMS),(THET(1),TZM)
50     XDELIM(X1,X2,X3)=AMAX1(X1,AMIN1(X2,X3))
51     *MEGMD=0,
52     IF(1,GT,2) GO TO 221
53     OPC=0,
54     GRV=0,
55     QOQ=1,
56     FCATS(V(1,9)-OMEGM).LT..9) QOQ=2

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VAR10550
VAR10560
VAR10570
VAR10580
VAR10590
VAR10600
VAR10610
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VAR10690
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VAR10980
VAR10990
VAR11000
VAR11010
VAR11020
VAR11030
VAR11040
VAR11050
VAR11060
VAR11070
VAR11080

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221 DO 220 L=I,KREAD
      J=XCIT(L)
      IF(J.EQ.28) GO TO 282
      IF(J.EQ.31) GO TO 295
      IF(J.EQ.6.OR.J.GT.26) GO TO 273
      IF(J.GT.23) GO TO 220
      IF(J.EQ.23) GO TO 219
      IF(J.EQ.13) GOV=-I.
      IF(J.LT.9.OR.J.GT.12) GO TO 223
      CALL GUST (J)
      GO TO 220
223 CONTINUE
      IF(J.EQ.18) GO TO 214
      IF(TIME.LT.XCIT(L,I)) GO TO 220
      IF(J.GT.12) GO TO 413
      RATE=XCIT(L,2)
      J=EO.1 IS FOR MR. COLLECTIVE INPUT
      J=EO.2 IS FOR MR. F/A CYCLIC INPUT
      J=EO.3 IS FOR MR. LATERAL CYCLIC INPUT
      IF(TIME.GT.XCIT(L,3)) RATE=0.
      IF(TIME.GE.XCIT(L,4)) RATE=0.
      IF(TIME.GT.XCIT(L,6)) RATE=0.
      DA=RATE*HDELT
      IF(J.EQ.5) GO TO 264
      IF(RATE.EQ.0.) GO TO 220
      GO TO (260,261,262,263,264,265,266,267).J
260 CONTINUE
      COLSTK=XDELIM(0.,100.,COLSTK+DA)
      WCOL=CPMIC*COLSTK+AGW
      GO TO 220
261 CONTINUE
      CYSTK1=XDELIM(0.,100.,CYSTK1+DA)
      CYCR1=CYSTK1*CYCF(3)+CYCF(2)
      ALECR1=ALGEZ+CYCR1*(ALGE1+ALGE2*CYCR1)
      GO TO 220
262 CONTINUE
      CYSTK2=XDELIM(0.,100.,CYSTK2+DA)
      CYCR2=CYSTK2*CYCL(3)+CYCL(2)
      ALCYP=CYPMIC*CYCR2
      GO TO 220
263 CONTINUE
      PEDAL=XDELIM(0.,100.,PEDAL+DA)
      PED=PEDAL*PEDA(3)+PEDA(2)
      ALGFPD=ALGF+RUDIND*PED
      GO TO 220
264 PCRATE=PCGMX *HDELT**2
      IF(XCIT(L,3).LT.TIME.AND.TIME.LT.XCIT(L,4)) GO TO 220
      IF(XCIT(L,6).LT.TIME) GO TO 220
      OPC=10.
      IF((DA*PSD550).EQ.0.) GO TO 220
      QMRS=XDELIM(0.,QMRSA,QMRS+DA/PSD550)
      GO TO 220
273 CONTINUE
      IF(LISTOP.NE.0.AND.I.EQ.4) GO TO 274

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VARI1090
VARI1100
VARI1110
VARI1120
VARI1130
VARI1140
VARI1150
VARI1160
VARI1170
VARI1180
VARI1190
VARI1200
VARI1210
VARI1220
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VARI1500
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VARI1590
VARI1600
VARI1610
VARI1620

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VARI1630
VARI1640
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VARI1680
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VARI1700
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VARI2010
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VARI2080
VARI2090
VARI2100
VARI2110
VARI2120
VARI2130
VARI2140
VARI2150
VARI2160

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IF(PSD.EQ.0.) GO TO 223
IF(J.EQ.29) GO TO 276
GO TO 220
274 CONTINUE
      ISTNP=2
      IF(J.EQ.29) GO TO 275
      XCIT(L,1)=XCIT(L,1)+T
      IF(J.EQ.30) GO TO 279
      XCIT(L,3)=XCIT(L,3)+T
      IF(J.EQ.27) GO TO 220
      XCIT(L,4)=XCIT(L,4)+T
      XCIT(L,6)=XCIT(L,6)+T
      GO TO 220
275 CONTINUE
      IF(XCIT(L,3).NE.0.) XCIT(L,1)=XCIT(L,1)+T
      IF(XCIT(L,4).NE.0.) XCIT(L,2)=XCIT(L,2)+T
276 CONTINUE
      IF(XCIT(L,3).EQ.0.) GO TO 223
      GO TO 220
279 CONTINUE
      XCIT(L,2)=XCIT(L,2)+T
      GO TO 220
265 CONTINUE
      DO 269 N=1,2
      RFTAZD(N)=-RATE
      IF(NPSI(N).EQ.0) GO TO 269
      BETAZ(N)=BETAZ(N)-DA
      9ETAN(N)=BETAZ(N)
      9ETAX(N)=BETAN(N)
269 CONTINUE
      CALL TFFA (XAR,BETAZ,CGSTA)
      GO TO 220
266 OMEGM=OMEGM+DA
      OMEGMD=RATE+OMEGMO
      300=1.
      GO TO 220
267 ZETATR=ZETATR+DA
265 XAR(2)=XARSP(2)+HL(2)*SIN(ZETATR)
      CZTR=COS(ZETATR)
      VAR(2)=YARSP(2)-HLTR1*CZTR
      ZAR(2)=ZARSP(2)-HLTR1*CZTR
      AY9MT=ZETATR*TRIND2
      AP8MT=-ZETATR*TRIND
      VZETAT=RATE
      IF(J.EQ.20) AZETAT=AZ
      GO TO 220
413 CONTINUE
      IF(J.EQ.27) GO TO 226
      IF(J.EQ.29) GO TO 283
      IF(J.EQ.30) GO TO 284
      K=J-12
      GO TO (209,210,211,212,213,214,215,216,217,218,219).K
209 IF(TIME-GE,XCIT(L,3)) GO TO 270
      300=XCIT(L,2)

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OMEGA=OMEGH+OMEG
OMEGND=OMEG*ROELT2+OMEGND
QQ=1.
GO TO 205
214 CONTINUE
IBRAKE=0
IF( TIME.GT.XCIT(L,4).OR.PSIO(1).GT.XCIT(L,2)) IBRAKE=1
GO TO 220
215 OLOASE=ASEP
FLAG=XCIT(L,6)*ROELT2
ASEP=(XCIT(L,2)*(XCIT(L,5)-APE)+XCIT(L,3)*APD+XCIT(L,4)*Y(I-1,80)
1 *OLOASE+FLAG)/(1+FLAG)
DA=ASEP
GO TO 261
216 IF( TIME.GT.XCIT(L,4)) GO TO 220
OT=XCIT(L,2)*(1-XCIT(L,1))
RATE=XCIT(L,3)*COS(OT)
OA=RATE*MOELT
K=XCIT(L,5)+.1
IF(K.EQ.5) AZ=-XCIT(L,2)*XCIT(L,3)*SIN(OT)
GO TO (260,261,262,263,271),K
217 IF(ABS(1/2*PI-ZETA).GT.0.001) GO TO 220
OAL=XCIT(L,3)*MOELT
O1=ALM-XCIT(L,4)
IF(ABS(O1).GT.XCIT(L,2)) OT1(1)=OT1(1)+OAL*O1
O1=BLM-XCIT(L,5)
IF(ABS(O1).GT.XCIT(L,2)) OT2(1)=OT2(1)-OAL*O1
GO TO 220
218 IF(ABS(1/2*PI-ZETA).GT.0.001) GO TO 220
OAL=XCIT(L,3)*MOELT
O1=ALM-XCIT(L,4)
IF(ABS(O1).GT.XCIT(L,2)) OT1(2)=OT1(2)+OAL*O1
O1=BLM-XCIT(L,5)
IF(ABS(O1).GT.XCIT(L,2)) OT2(2)=OT2(2)-OAL*O1
GO TO 220
219 CONTINUE
M=XCIT(L,1)+.1
HUBK(N)=XOELIM(XCIT(L,3),XCIT(L,2),
1 HUBK(1,N)*PSIO(N)+HUBK(1,N))
HUBK(N,2)=XOELIM(XCIT(L,3),XCIT(L,2),
1 HUBK(2,N)*PSIO(N)+HUBK(2,N))
GO TO 220
282 CONTINUE
N=XCIT(L,1)+.1
BETANN=XOELIM(XCIT(L,3),XCIT(L,2),XCIT(L,4)+XCIT(L,5)*PSIO(N))
IF(BETANN.EQ.XCIT(L,2).AND.XCIT(L,6).GT..5) GO TO 220
IF(METANN.EQ.XCIT(L,3).AND.XCIT(L,6).LT..5) GO TO 220
BETANN=BETANN
VPSIN=NPST(N)
IF(BETANN.EQ.XCIT(L,2)) XCIT(L,6)=1.
IF(BETANN.EQ.XCIT(L,3)) XCIT(L,6)=-1.
DA=0.
IF(BETAZ(N).GT.(-BETANN)) OA=BETAZ(N)+BETANN
IF(METAZ(N).LT.(-BETANN).AND.BETAZ(N).LT.BETAZ(N))

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VARI2710
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VARI3170
VARI3180
VARI3190
VARI3200
VARI3210
VARI3220
VARI3230
VARI3240

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10A=BETAZ(N)-AMIN1(BETAZ(N),(-BETAMN))
BETAZ(N)=BETAZ(N)-OA
BETAX(N)=BETAZ(N)*2.-BETAMN
DO 301 K=1,NPSIN
  BETA(K,N)=BETA(K,N)-OA
  Y(1,7*N+K+10)=Y(1,7*N+K+10)-OA
301 CONTINUE
  IF(KONFIG.EQ.3) CALL TFFA (XAR,BETAZ,CGSTA)
  GO TO 220
283 CONTINUE
  XLOK=1.
  IF(XCIT(L,6).EQ.0.) GO TO 277
  XLOK=0.
  XCIT(L,2)=9999.
277 CONTINUE
  N=XCIT(L,5)
  DO 278 M=1,4
    N1=5-M
    N2=2*(N1-1)
    IF(N.LT.N2) GO TO 278
    CONLOK(N1)=XLOK
    THETS(N1)=THET(N1)
    IF(N1.GT.2) THETS(N1+2)=THET(N1+2)
    N=N-N2
278 CONTINUE
    XCIT(L,1)=XCIT(L,2)
    XCIT(L,3)=XCIT(L,4)
    XCIT(L,6)=1.
    GO TO 220
284 CONTINUE
    IF(IME.LE.XCIT(L,2)) GO TO 285
    KPD=0
    XCIT(L,1)=9999.
    GO TO 220
285 CONTINUE
    IF(1.NE.2) GO TO 292
    XMOM(1)=ZF
    XMOM(2)=XMB1
    XMOM(3)=XMA1
    IF(KPO.NE.0) GO TO 288
    DO 287 K=1,3
      DO 286 M=1,3
        POM(K,M)=0.
286 CONTINUE
        POM(K,K)=XCIT(L,K+2)
        POM(K,4)=-XMOM(K)
287 CONTINUE
        GO TO 290
288 CONTINUE
        DO 289 K=1,3
          POM(K,KPO)=(XMOM(K)+POM(K,4))/OTHET
          POM(K,4)=-XMOM(K)
289 CONTINUE
          OTHETO(KPO)=OTHET

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VARI3250
VARI3260
VARI3270
VARI3280
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VARI3780

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290 CONTINUE
KPD=KPD+1
IF(KPD.EQ.4) KPD=1
DO 291 K=1,4
DO 291 M=1,3
  POPHIM,K)=PDM(M,K)
291 CONTINUE
KMI=3
CALL SOLVE
IF(EXIT.EQ.0.) GO TO 293
  DTHET=C.
  EXIT=0.
  GO TO 294
293 CONTINUE
  DTHET=XIKPD)
  XLIMD=XCITIL,6)*TDELT
  DTHET=XDELIM(-XLIMD,XLIMD,DTHET)
294 CONTINUE
  DXMIN=.8726646E-02*TDELT
  IF(ABS(DTHET).LT.DXMIN) DTHET=SIGN(DXMIN,DTHETO(KPD))
292 CONTINUE
  THETS(KPD)=THETS(KPD)+.5*DTHET
  GO TO 220
295 CONTINUE
  DO 296 K=1,5,2
  IF(TIME.GF.XCITIL,K)) NPRINT=XCITIL,K+1)
296 CONTINUE
  IF(NPRINT.LE.0) NPRINT=1
  GO TO 220
226 CONTINUE
  IF(XCITIL,3).LT.TIME) GO TO 220
  DA=XCITIL,2)*TDELT
  K=XCITIL,4)+.1
  K1=K
  NPSI1=NPSI(1)
  IF(K.NE.1) GO TO 228
  PSIREF11)=PSIREF11)+DA
  Y11,7)=Y11,7)+DA
  DO 227 M=2,NPSI1
    DPSIIM,1)=DPSI(M,1)-DA
227 CONTINUE
  K1=NPSI1
  GO TO 231
228 CONTINUE
  DPSI1K,1)=DPSI1K,1)+DA
231 CONTINUE
  IF(HUBKPS.NE.0.) GO TO 220
  DO 230 N=K,K1
  DO 229 M=1,NPSI1
    COSEIM,N,1)=COS(DPSI(M,1)-DPSI1N,1))
229 CONTINUE
  COSF(N,N,1)=1.
230 CONTINUE
  CALL HSAF (XAR,YAR,DPSI,NPSI,CGSTA,PSIREF)

```

```

VARI3790
VARI3800
VARI3810
VARI3820
VARI3830
VARI3840
VARI3850
VARI3860
VARI3870
VARI3880
VARI3890
VARI3900
VARI3910
VARI3920
VARI3930
VARI3940
VARI3950
VARI3960
VARI3970
VARI3980
VARI3990
VARI4000
VARI4010
VARI4020
VARI4030
VARI4040
VARI4050
VARI4060
VARI4070
VARI4080
VARI4090
VARI4100
VARI4110
VARI4120
VARI4130
VARI4140
VARI4150
VARI4160
VARI4170
VARI4180
VARI4190
VARI4200
VARI4210
VARI4220
VARI4230
VARI4240
VARI4250
VARI4260
VARI4270
VARI4280
VARI4290
VARI4300
VARI4310
VARI4320

```


220 CONTINUE
RETURN
END

VARI4330
VARI4340
VARI4350

```

SUBROUTINE VIND (N,EXIT)
COMMON /ROMAN/
* 22,VXS(2),VYS(2),VZS(2),BETA(12,2),
* T-PCC(2),COSE(7,7,2),BETAN(2),BETAX(2),BETAZ(2),
* AIB(2),APDO,APDO,AYDO,AIR(2),
1 DPSI(12,2),OTRR,NPSI(2),ZZTR,
2 BETAD(12,2),BNPSI(2),
3 COMD2,GMAXV,RATE2,STOP2,
4 THROT(2),TRIND,XGUST,BETAZO(2),GMAXV1,
5 GMAXV2,GMAXV3,GUSTYP,MNPSIR(2),
6 HUBKPS,HUBKRS,HUBTPS,HUBTRS,
7 KONFIG,LNGTH1,PILGH1,PSIREF(2),
8 START2,XMOHLI(12,2),
9 R(2),OR(2),TI(2),
A T2(2),TZR(2),XMA(2),
R XMB(2),AIB(2),AIBR(2),
C APOR(2),AROR(2),PSIO(2),
D XSTAH(2),VSTAH(2),
E HUBKPR(2),HUBKRR(2)
F *AZETAR(2),VZETAR(2)
COMMON /MANARO/
1 I-V-IND,MNAG,APBMT,ARBMT,AYBMT,BETAD(2),TDELT,
2 BETAE(2),HGUSTE,HGUSTF,HGUSTW,VGUSTE,
3 VGUSTW,VGUSTF,GFWD,GLAT,GVERT,
4 VXB,VZB,APD,VYB,ARD,AYD,
5 COLSTK,CYSTK1,CYSTK2,PEDAL,AYE,
6 APE,ARE,AIM,BIM,AITR,BITR,
7 XAR(2),YAR(2),ZAR(2),
8 VIR(2),ZETAR(2),HFORCE(2),
9 THRUST(2),TORQUE(2),YFORCE(2)
COMMON /STANRO/
1 J-M-ITM,VHS(2),LINK,OELE,VROT(2),
2 VSND,YFINI(2),ZFEL(2),AIBAL(2),
3 B1BAL(2),COND1,SWING,PILGH2,PHCELL,
4 R(2),PHOM(2),RMOM(2)
COMMON /ROSTAR/
1 AM(2),CT,PI,XR(2),ALT,ADR(2),EXH(2),
2 NXR(2),RBH(2),SWC(2),UHS,CDH8(2),LROT(2),
3 ZAIR(2),RTRP(2),TAIR(14),CONEX(2),DCAFR(2),FVINO,
4 NVARD,
5 SWKR1(2),SWKR2(2),TIP19(2),TIP38(2),
6 TWIST(20,2),CLRAOK(2),OELTA3(2),
7 LAMBOA(2),UPGUST,URGUST,UTGUST,WROTOR,
8 ER(2),FRX(2),
9 XLIMAX(2),XLIMIN(2)
PEAL LAMBOA,LAMZ
98=1-2.*SORT(ABS(CT))/(ABS(OR(N))*8(N))
CB=CT/(180*8B-ADR(N))
OI=ABS(CB)
O2=-6*OI*SORT(O1)
O3=OI*8.*UHS
O4=O2/O3
O5=OI*O4
O6=2.666667*O4
LAMBDA(N)=VZS(N)
L=100
17 CONTINUE
L=L-1

```

```

IF(L.LE.0) GO TO 30
VIRS=VIR(N)
LAM2=LAMBDA(N)**2
VIR(N)=CB/(SQRT(.866*LAM2+UHS)+(Q5-Q6*LAMBDA(N)*ABS(LAMBDA(N)))/
1 (Q1+8.*LAM2))
LAMBDA(N)=VZS(N)-VIR(N)
IF(ABS(VIR(N)-VIRS).GT..0001) GO TO 10
GROUND EFFECT - FOR V.LT.30 AND IF H IS FROM .25 TO 1. ROTOR DIAMETER
VIND0550
VIND0560
VIND0570
VIND0580
VIND0590
VIND0600
VIND0610
VIND0620
VIND0630
VIND0640
VIND0650
VIND0660
VIND0670
VIND0680
VIND0690
VIND0700
VIND0710
VIND0720
VIND0730
VIND0740
VIND0750
VIND0760
VIND0770
VIND0780
VIND0790
VIND0800

GRE=.25+.5*ALT/R(N)
IF(GRE.GT.1.) RETURN
IF(VROT(N).LE.30.) VIR(N)=VIR(N)*(1.+(GRE-1.)*((VROT(N)-30.)/
1 /30.))**2
IF(GRE.GE..25) RETURN
EXIT=1.
WRITE(6,9000)
RETURN
30 WRITE(6,9001)
VIR(N)=0.
LAMBDA(N)=VZS(N)
RETURN
9000 FORMAT(28H0.....SHIP CONTACTS GROUND)
9001 FORMAT(27H0INDUCED VELOCITY SET TO 0.728H CALCULATIONS NON-CONVERG
1ENT)
END

```

```

SUBROUTINE WAG1
DIMENSION HEAD(2),FX(61,4),XD(4),DETH(31,4),KFLAG(4)
DATA HEAD /'MAINTAIL'/
DO 100 I=1,4
KFLAG(I)=0
100 CONTINUE
RETURN
ENTRY WAG (CHR,K,I,V,TDLT,RED,DLIFT)
RED=0.
IF(KFLAG(I).EQ.1) GO TO (40,40,30,30),I
1 K2=(K-1)/2+1
K4=(K-1)/4+1
DETH(K4,I)=DLIFT
IF(I.GT.2) GO TO 8
DD=TDLT*.5*V/(2.*CHR)
IF(K2.GT.2) GO TO 2
IF(DO.GT..5) GO TO 41
GO TO 9
8 DD=TDLT*V/CHR
IF(K2.GT.2) GO TO 2
IF(DO.GT.7.5) GO TO 31
9 IF(K2.NE.1) GO TO 2
XC(I)=DD
GO TO 3
2 IF(MOD(K,2).EQ.1) XD(I)=DD+XD(I)
3 A=XD(I)
IF(I.GT.2) GO TO 4
IF(A.GT.1.) GO TO 5
1+A*(-97.5837+A*(67.39273+A*(-18.53368))))))
FX(K2,I)=1-((.5+A*(6.011997+A*(-28.92326+A*(72.13591
IF(K.LE.10) GO TO 10
GO TO 5
4 IF(A.GT.15.) GO TO 5
FX(K2,I)=.2838*EXP(-.49*A)
IF(K.LE.120) GO TO 10
5 DO 6 J=2,K4
6 DETH(J-1,I)=DETH(J,I)
K=K-1
K2=K2-1
K4=K4-1
10 DO 20 J=1,K4
M=K2-2*(J-1)
20 RED=RED+DETH(J,I)*FX(M,I)
50 RETURN
31 KFLAG(I)=1
30 WRITE (6,60)
60 FORMAT (1H0,13X,'ALLEVIATION DEVICE FOR WINGS BYPASSED BECAUSE WINWAG00470
15 CHORD IS TOO SMALL FOR THIS TIME INCREMENT AND VELOCITY.')
```

WAG00010
WAG00020
WAG00030
WAG00040
WAG00050
WAG00060
WAG00070
WAG00080
WAG00090
WAG00100
WAG00110
WAG00120
WAG00130
WAG00140
WAG00150
WAG00160
WAG00170
WAG00180
WAG00190
WAG00200
WAG00210
WAG00220
WAG00230
WAG00240
WAG00250
WAG00260
WAG00270
WAG00280
WAG00290
WAG00300
WAG00310
WAG00320
WAG00330
WAG00340
WAG00350
WAG00360
WAG00370
WAG00380
WAG00390
WAG00400
WAG00410
WAG00420
WAG00430
WAG00440
WAG00450
WAG00460
WAG00470
WAG00480
WAG00490
WAG00500
WAG00510
WAG00520
WAG00530
WAG00540

RETURN
END

WAG00550
WAG00560

```

SUBROUTINE WRFM
COMMON /FORCE/ A(71)
COMMON /ROMAN/
*
*      ZZ,VXS(2),VVS(2),VZS(2),BETA(12,2),
T,PCC(2),COSE(7,7,2),BETAN(2),BETAX(2),BETAZ(2),
AIB(2),APDD,ARDD,AYDD,AIR(2),
DPSI(12,2),OTRR,NPSI(2),ZZTR,
BETAD(12,2),BNPSI(2),
COND2,GMAXV,RATE1,RATE2,STOP2,
THROT(2),TRIND,XGUST,BETAZD(2),GMAXV1,
GMAXV2,GMAXV3,GUSTYP,HMPSIR(2),
HURKPS,HURKRS,HUBTPS,HUBTRS,
KONFIG,LNGTH1,PILGH1,PSIREF(2),
START2,XMOMLI(12,2),
RM,RTR,ORM,ORTR,TIMT,T1TT,
T2MT,T2TT,T2MT,T2TT,XMAL,XMALT,
XMB1,XMBIT,AIBPM,AIBPT,AIBRM,AIBRT,
APTD,APTTD,ARTD,ARTTO,PSO,PSOT,
XSTAHM,XSTAHT,YSTAHM,YSTAHT,
HUBKP,HUBKTP,HUBKR,HUBKTR
,AZETA,AZETAT,VZETA,VZETAT
WRITE (6,10) A,XMB1,XMAL,XMBIT,XMALT
RETURN
10 FORMAT (1H0,54X,'FORCE AND MOMENT SUMMARY',//
1H ,15X,'TOTAL R-WING L-WING T-R. T-R. GUN FUS',
2 4X,'R-JET L-JET M-R. M-R. FIN',
3 4X,'W/QMR QTR'//
4 1H ,X-FORCE ,12F9.1/
5 1H ,Y-FORCE ,F9.1,27X,8F9.1/
6 1H ,Z-FORCE ,10F9.1,9X,F9.1/
7 1H ,ROLL ,13F9.1/
8 1H ,PITCH ,13F9.1/
9 1H ,YAW ,13F9.1/
A 1H ,MR F/A MOM',F9.1/
B 1H ,MR LAT MOM',F9.1/
C 1H ,TR F/A MOM',F9.1/
D 1H ,TR LAT MOM',F9.1////)
END

```

WRFM0010
WRFM0020
WRFM0030
WRFM0040
WRFM0050
WRFM0060
WRFM0070
WRFM0080
WRFM0090
WRFM0100
WRFM0110
WRFM0120
WRFM0130
WRFM0140
WRFM0150
WRFM0160
WRFM0170
WRFM0180
WRFM0190
WRFM0200
WRFM0210
WRFM0220
WRFM0230
WRFM0240
WRFM0250
WRFM0260
WRFM0270
WRFM0280
WRFM0290
WRFM0300
WRFM0310
WRFM0320
WRFM0330
WRFM0340
WRFM0350
WRFM0360
WRFM0370

```

SUBROUTINE WROT1
COMMON /TOPLOT/ AH(3),AL(3),EXIT,ICOM(49),IPSN,
1 NPART,NVARA,NVARB,NVARC,NSCALE
1 NVAR,NPRINT,NTIME
1 DIMENSION NDATE(2)
CALL DATE (NDATE)
RETURN
ENTRY WROT
WRITE (6,1000) NDATE,NPART,IPSN,ICOM
RETURN
1000 FORMAT (1H1,46X,'BELL HELICOPTER IBM 360/ PROGRAM ASAJ0: '//
1 1H ,46X,'HELICOPTER RIGID BODY DYNAMICS ANALYSIS'//
2 1H ,57X,'COMPILED 10/30/69'//
3 1H ,57X,'COMPUTED ',2A4//
4 1H0,18X,14,4X,19,5X,15A4/1H ,32X,17A4,/1H ,32X,17A4)
END
WROT0010
WROT0020
WROT0030
WROT0040
WROT0050
WROT0060
WROT0070
WROT0080
WROT0090
WROT0100
WROT0110
WROT0120
WROT0130
WROT0140
WROT0150
WROT0160

```



```

WRITE (6,60) (HEAD(I,21),I=1,3),(PD(I,KM1+1),I=1,KM1)
RETURN
20 FORMAT (1H0,11X,'VAR(I) ',10F10.5)
10 FORMAT (/1H ,30X,'THRUST H-FORCE Y-FORCE TORQUE ',
1 'IND. V. CONING JET THRUST',/16X,
2 'MAIN ROTOR',4F10.0,2F10.3,5X,'RIGHT/CENTER',F10.0/16X,
3 'TAIL ROTOR',4F10.0,2F10.3,5X,'LEFT ',F10.0)
30 FORMAT (1H0,53X,'PARTIAL DERIVATIVE MATRIX',/1H0,11X,30A4/)
60 FORMAT (1H ,3A4,10F12.0)
END

```

```

MRVP0550
:MRVP0560
MRVP0570
MRVP0580
MRVP0590
MRVP0600
MRVP0610
MRVP0620
MRVP0630
MRVP0640

```

```

SUBROUTINE YFIX (VIN,VAERO)
  DIMENSION HEAD(9),VIN(21,5),VAERO(31,5)
  DATA HEAD / 'M.R.T.R.WING ELE FINNORMAL REVERSED' /
  DATA DTRR,PI23,DTRRSO / 57.29578,2.0943951,3282.806 /
  DO 15 I=1,18
    DD=1.
    IF(I.EQ.13.OR.I.EQ.17) DD=DTRR
    IF(I.EQ.14) DD=DTRRSO
    DO 18 J=1,5
      VAERO(I,J)=VIN(I,J)*DD
    18 CONTINUE
  15 CONTINUE
  DO 20 J=1,5
    IF(VAERO(17,J).EQ.0.) GO TO 20
    VAERO(18,J) = VAERO(18,J)*PI23
    ALB1MR=VAERO(17,J)*VIN(18,J)/(2.+VIN(18,J))
    IW1=-1
    IW2=2
    DO 25 IW=22,23
      IW1=IW1+4
      IW2=IW2+2
      VAERO(IW,J)=VAERO(IW1,J)/ALB1MR+.08727
      IF(VAERO(IW,J).LE..69813) GO TO 25
      VAERO(IW1,J)=.61087*ALB1MR
      VAERO(IW,J) = .69813
      WRITE (6,26) HEAD(J),(HEAD(IW2+K),K=2,3),VAERO(IW1,J)
    25 CONTINUE
  27 CONTINUE
    VAERO(20,J)=SIN(VAERO(22,J))
    VAERO(24,J)=SIN(2.*VAERO(22,J))
    VAERO(26,J)=COS(VAERO(22,J))
    VAERO(21,J)=SIN(VAERO(23,J))
    VAERO(25,J)=SIN(2.*VAERO(23,J))
    VAERO(27,J)=COS(VAERO(23,J))
    IF(VAERO(1,J).LT.1.) GO TO 12
    VAERO(1,J)=.99
    WRITE (6,101) HEAD(J),VAERO(1,J)
  12 SM = SORT(1.+(1.-VAERO(1,J)**2)*16./VAERO(17,J)**2)
    IF(VAERO(2,J).GT.SM) GO TO 29
    VAERO(2,J)=SM
    WRITE (6,102) HEAD(J),VAERO(2,J)
  29 VY1 = VAERO(17,J)/SORT(1.-VAERO(1,J)**2)
    VY2 = 4./SORT(VAERO(2,J)**2-1.)
    VY3 = -VY2*VAERO(2,J)/(VAERO(2,J)**2-1.)
    DEN = 1./((VAERO(2,J)-VAERO(1,J))**2
    VAERO(31,J) = ( VY1-VY2-VY3*(VAERO(1,J)-VAERO(2,J)))*DEN
    VAERO(30,J) = VY3 - 2.*VAERO(31,J)*VAERO(2,J)
    VAERO(29,J) = VY1-VAERO(30,J)*VAERO(1,J)-VAERO(31,J)*VAERO(1,J)**2
  20 CONTINUE
  RETURN
26 FORMAT (1H0,10X,A4,' CLZ FOR ',2A4,' FLOW HAS BEEN RESET TO
1 F6.3,' ALB = 40 DEGREES.')
101 FORMAT (1H0,10X,A4,' DRAG DIVERGENCE MACH NUMBER HAS BEEN RESET TO',F6.3)
1 F6.3)

```

YFIX0010
 YFIX0020
 YFIX0030
 YFIX0040
 YFIX0050
 YFIX0060
 YFIX0070
 YFIX0080
 YFIX0090
 YFIX0100
 YFIX0110
 YFIX0120
 YFIX0130
 YFIX0140
 YFIX0150
 YFIX0160
 YFIX0170
 YFIX0180
 YFIX0190
 YFIX0200
 YFIX0210
 YFIX0220
 YFIX0230
 YFIX0240
 YFIX0250
 YFIX0260
 YFIX0270
 YFIX0280
 YFIX0290
 YFIX0300
 YFIX0310
 YFIX0320
 YFIX0330
 YFIX0340
 YFIX0350
 YFIX0360
 YFIX0370
 YFIX0380
 YFIX0390
 YFIX0400
 YFIX0410
 YFIX0420
 YFIX0430
 YFIX0440
 YFIX0450
 YFIX0460
 YFIX0470
 YFIX0480
 YFIX0490
 YFIX0500
 YFIX0510
 YFIX0520
 YFIX0530
 YFIX0540

1?? FORMAT (1H0,10X,A4,,' MACH NUMBER FOR LOWER BOUND OF SUPERSONIC REGYFIX0550
110N HAS BEEN RESET TO ',F6.3) YFIX0560
END YFIX0570

UNCLASSIFIED

Security Classification

DOCUMENT CONTROL DATA - R & D		
(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)		
1. ORIGINATING ACTIVITY (Corporate author)		2a. REPORT SECURITY CLASSIFICATION
Bell Helicopter Company Fort Worth, Texas 76101		Unclassified
		2b. GROUP
3. REPORT TITLE		
A STABILITY AND CONTROL PREDICTION METHOD FOR HELICOPTERS AND STOPPABLE ROTOR AIRCRAFT -- VOLUME IV		
4. DESCRIPTIVE NOTES (Type of report and inclusive dates)		
Final Report		
5. AUTHOR(S) (First name, middle initial, last name)		
Billy J. Bird		
6. REPORT DATE	7a. TOTAL NO. OF PAGES	7b. NO. OF REFS
February 1970	304	
8a. CONTRACT OR GRANT NO.	8b. ORIGINATOR'S REPORT NUMBER(S)	
F33615-69-C-1121		
b. PROJECT NO. 8219		
c. Task No. 821907	8b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)	
d.	AFFDL-TR-69-123, Volume IV	
10. DISTRIBUTION STATEMENT		
This document has been approved for public release and sale; its distribution is unlimited.		
11. SUPPLEMENTARY NOTES		12. SPONSORING MILITARY ACTIVITY
		Air Force Flight Dynamics Laboratory Wright-Patterson AFB, Ohio 45433
13. ABSTRACT		
<p>This report describes a mathematical model of rotorcraft that may be used to determine characteristics of performance, stability, response, and rotor blade loads. The complexity of the equations used requires the use of a digital computer for efficient solution. This four volume report describes the computer program in detail and illustrates the method of computing rotorcraft characteristics by specific example.</p> <p>This volume contains the Appendices. Volume III describes the contents and use of these appendices in detail. The first and second volumes contain a discussion of the mathematical model and detailed instructions for the users of the program.</p> <p>These appendices, which originate from card images for easy updating, are necessary tools for any programmer working on this program.</p>		

DD FORM 1 NOV 66 1473

UNCLASSIFIED

Security Classification

14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Helicopter Stability and Control Stoppable Rotor Aircraft Stability and Control V/STOL Aircraft Rotorcraft Simulation						